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THE MEANING AND MEASUREMENT
OF
NEUROTICISM AND ANXIETY

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PREFACE

. . nature can neither be invented [interpreted] with sufficient subtilty nor demonstrated with sufficient perspicuity nor accommodated unto use with sufficient dexterity, without the aid and intervening of mathematics. . . .

—Francis Bacon, *Advancement of Learning,* Bk. 3

Nowadays there is a new feeling in the atmosphere of clinical psychology. For at least a decade, as accumulating evidence has limelighted the need for more effective treatment and more adequate theories, a genuine dissatisfaction and search for new possibilities has prevailed. Out of basic experimental quantitative research on the normal personality, the possibilities of an entirely new foundation have now become visible. The purpose of our book is to organize the evidence from this quantitative and experimental area. For the theorist this leads, we believe, to logical avenues toward a more positive and impressive system, and, for the practitioner, to an escape from much of the guesswork which now darkens his practice.

The core of what is presented derives, as stated above, from experimental work on the normal range of personality, some of which has been systematically carried out in our own laboratory over the last twenty years. That it had fundamental implications for clinical work was always apparent, but it is only in the last five years that we have taken research time to bring out more explicitly this importance for abnormal behavior and to work on clinical, pathological samples of the population. We hope the results will be highly encouraging both to the clinical theorist and the practitioner, though their proper import can be grasped only by the reader who is prepared to accept radically new ideas.

The four aspects of our subject—methodology, results, theory, and applications—are interwoven throughout the book. Methodology is concentrated in Chapter 3 but is also discussed wherever relevant in relation to the particular clinical problem to which the method is applied. The results of pre-metric theories will be found in Chapter 2, and our own results are presented in Chapters 4 through 11. Chapter 2 also reviews pre-metric theory, and Chapters 12 and 13 integrate theoretically the data contained in Chapters 4 through 11, wherever possible relating them to and incorporating them with the pre-metric theories of Chapter 2. The final two chapters, 14 and 15, on applications, draw on the data and theory of the entire book. It is our hope and belief that they provide conceptually clear and precise instruments of measurement for use in research and routine practice.

We have written this book for two types of readers. On the one hand, we have addressed ourselves to the skilled practitioner in psychiatry, applied psychology, and even general medicine, who seeks to increase the reliability of diagnosis and treatment by understanding and using precise scientific instruments to measure levels of anxiety and severity of neurosis. On the other hand, certain chapters have been written more for the clinical researcher who is eager to start research forays on a firmer basis of empirical findings about personality structure.

Writing for both types of readers has presented certain difficulties which we have sought to overcome by designating, at appropriate points, chapters or sections which might be of primary interest to one or the other. In general we have tried to organize our materials to facilitate these separate emphases. The researcher will be more concerned with the theoretical speculations in Chapters 12 and 13 and with the more challenging and intricate frontiers of research revealed in Chapters 8 through 11. The practitioner, wishing to get quickly to diagnostic devices and to evaluate their usefulness to him, may get an idea of the basic results in Chapters 3 through 6 and then pass lightly over the technical intricacies of the intervening chapters to concentrate on Chapters 14 and 15, which apply these results in the form of improved measuring instruments and discuss their strategic use in clinical diagnosis and therapy.

We believe that this book fully demonstrates the possibility of precise measurement of anxiety, of severity of neurosis and of the dynamic components in anxiety. The measurements we describe make it possible to erect and maintain a standard, stable and checkable system of diagnosis, prognosis, and therapy. We are fully aware, however, that much information has yet to be gathered. At certain points, our presentation has missing links of inference which we have had to bridge by relatively thin data. We hope and believe these bridges will soon be substantially strengthened by additional data. A great present gap is in the measurement of psychosis and its differentiation from neuroticism and anxiety. Another frontier is the mutual differentiation of the neurotic syndrome groups. Here we have barely had sufficient cases to draw conclusions in terms of questionnaire factors, and quite insufficient cases for conclusions in terms of objective tests. Thus we close this preface on a note of challenge for the research still to be done, and of optimism that our book will engender the impetus to achieve it, and that, even now, it will make possible clinical applications for the alleviation of human suffering.

Urbana, Illinois
February, 1961

Raymond B. Cattell
Ivan H. Scheier

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We wish especially to record our research indebtedness to the following clinical practitioners and researchers and to the institutions they represent: Drs. Roy Grinker, Sheldon Korchin, Bernard Engel, Neena Schwartz, and Helen Heath of the Institute for Psychosomatic and Psychiatric Research and Training, Michael Reese Hospital, Chicago; Dr. Samuel Karson, Assistant Director, Dade County Child Guidance Clinic, Miami, Fla.; Dr. Fred Damarin, Jr., the University of Illinois; Dr. Frank Warburton, the University of Manchester; Dr. Clifford Swensen, Psychological Service Center, Knoxville, Tenn.; Dr. Ernest Klein and Mr. Jerome Yalowitz, Peoria State Hospital, Peoria, Ill.; Dr. H. C. Hutchison and Mr. Owen White, Department of Health, Toronto Psychiatric Hospital; Dr. Saul B. Sells, Texas Christian University; Captain Sheldon Freud, Chief, Clinical Psychology Section, Andrews Air Force Base Hospital; Dr. Robert Fischer, Consulting Psychologist, Marietta, Ohio; Dr. Joseph King, Industrial Psychology, Inc.; the late Dr. Allister Macmillan; Lt. Robert Knapp, Head, Division of Psychology, Naval Medical Research Laboratory, Camp Lejeune, N.C.; Mr. Tadashi Tsushima and Mrs. Yukiko Tsushima, University of Kyoto, Japan; Dr. Stanley Liutkus, Director, Department of Psychology, The New Jersey State Hospital; Dr. John C. Park, Florida Guidance Institute, Orlando, Fla.; Dr. Bernard Fitzgerald, Philadelphia State Hospital; Dr. Anthony Farmer, Wyoming State Hospital; Dr. Phyllis W. Huffman, Chief, Psychology Service, Illinois Department of Public Welfare; Dr. Gordon McMurray, University of Saskatchewan; Dr. Samuel Dubin and Miss Ida Weightman, Harrisburg State Hospital, Harrisburg, Penn.; Dr. V. Gerald Ryan, Elmcrest Manor, Portland, Conn.; Mr. Edgar M. Haverland, U.S. Army Human Research Unit, Fort Bliss, Texas; Dr. A. Chapman Isham, Lubbock, Texas; Dr. Joseph Finney, Champaign County Mental Health Clinic, Champaign, Ill.; and the supervisors and staff members who gave such generous support at the University of Illinois College of Medicine in Chicago, at Anna, Alton, Elgin, East Moline, and Kankakee State Hospitals in Illinois, and at Winwick Hospital, Winwick, England.

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We trust that full credit has been given, in our discussions and in the References, to the psychologists whose published results have been drawn upon, but we wish also to recognize here the unheralded yet able assistance of our own laboratory research staff: Messrs. John Horn, George Mayeske, Donald Tollefson, John Hurley, and William Sullivan, and Mrs. Marcia Sedgwick. We gratefully acknowledge the efficiency with which the manuscript was prepared and typed by Mrs. Paula Barthel, Mrs. Deborah Skehen, Mrs. Phyllis Kingery, Mrs. Mary Gaddy, and Miss Laura Rhodes.

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THE MEANING AND MEASUREMENT
OF
NEUROTICISM AND ANXIETY

CHAPTER 1

THE PROBLEM OF NEUROSIS AND ANXIETY: ITS SEVERITY AND THE INDISPENSABILITY OF MEASUREMENT IN DEALING WITH IT

Social and Scientific Challenge of Psychiatric Disorders

"Modern" man remains unwilling to apply to self-understanding the very scientific attitudes and principles which have won him awesome material and technical ascendancy. This is the twentieth-century paradox—that man is more and more the master of things, but dangerously obsolete in his techniques for understanding and mastering himself.

Current techniques are so obsolescent that—and this is very nearly the ultimate in frustration—we cannot even agree precisely on the extent and nature of psychiatric problems facing society, their relationships to ecological and personal history characteristics, or the extent to which these problems are increasing or decreasing. Without exact, objective, meaningful measurements, investigators differ in the criteria used in defining neuroticism or anxiety; hence, they arrive at different figures for incidence, trend, etc. Only a very small proportion of persons are at any one time institutionalized as neurotics, probably no more than 1 per cent of the total population and less than 5 or 6 per cent of the hospitalized, mentally ill population. But the figure would be much larger when based upon the more humane and reasonable general criterion, namely, those "in need of treatment of some kind for neurosis, whether or not it is being received." As Brown (23) points out, the vast majority of psychoneurotics never receive adequate treatment. Brown's review concludes (23, p. 278): "Best medical opinion seems to be, however, that a very large number of individuals suffer psychoneurosis in one or another of its manifestations. In fact, modern psychiatric opinion considers an individual who never had some mild morbidity as rare as the individual who never catches cold. Some psychiatrists estimate that the average individual should and could—although he does not—profitably consult a psychiatrist about six times a year." We confidently believe that most clinicians and laymen will concur generally that the above applies to anxiety as well as to neurosis. Moreover, this opinion is supported by two of the most methodologically advanced studies to date (136, 147), using measurement and careful sampling techniques. These studies arrive at the truly shocking verdict of neurosis prevalence in the general population of at least 25 per cent, and possibly as high as 57 per cent. Thorough discussions are available elsewhere (186, 197, 233) on findings and methodological problems in the epidemiology of mental disease. But, for our present purposes, it is enough to recognize that, beyond any reasonable doubt, anxiety and neurosis are a severe problem for the medical practitioner and a threat to the well-being of society generally.

It is strange that pervasive fears should be so prevalent in a period when medicine is making such great strides in the control of physical disease that death is, for most people, more remote than it was, say, in the daily round of the Middle Ages. Later, in examining the cultural conditioning of anxiety and neurotic conflict, we may succeed in demonstrating the sources of stress and the complexity of life which are responsible for this state of affairs. But for the moment, we shall accept the alarming prevalence of mental disease as a fact, documented elsewhere, and turn our attention to clarifying nervous disorders themselves, with the hope that medicine may eventually succeed in treating these psychological diseases as positively as it does many "organic" disorders.

Need for, and Nature of, the Scientific, Metric Approach

Admittedly, the attention given to mental disorders has increased with recognition of their prevalence. But increase of understanding has not paralleled the increase in research workers and funds, mainly, we believe, because of outdated methods. It seems to us that contemporary clinical psychology now stands between a spent movement and a new movement, between an era of pre-metric theory, founded on brilliant clinical observation and reasoning, but devoid of measurement techniques, and a beckoning era of experimental and statistical clinical theory, promised by the findings of an active group of research psychologists trained in newer and more complex methods.

In the first half of this century, a number of imposing pre-metric theories provided a rationale for psychotherapy—Freudian, Adlerian, Jungian, and many others. Unfortunately, such theorizing was not always confined to individuals of brilliant clinical observation and reasoning capacity. In several instances, the insights of these intellectual giants have been lost in the modifications of later and less able writers, just as masterpieces of art and architecture have been renovated and "improved" by later schools. So long as intuition and personal insight, rather than measurement and replicable experiment, remain the basis of clinical theory and practice, it is bound by the limitations of an art; that is, it lacks the architectonic growth of science and is doomed to arrest at the qualitative level. Pre-metric theory is undoubtedly at least a first approximation to the truth. One can only admire the sincere, painstaking, and penetrating observation that has shaped it. But scientifically, such clinical-anecdotal theories will inevitably be incomplete and undependable as compared to the refined, checkable concepts and laws which can be built on a foundation of exact measurement. It is not even necessary to criticize pre-metric theories point-by-point, for one can show, with Eysenck (87, pp. 25–32), that as a whole, there is no firm statistical evidence even of their pragmatic ability to work, as claimed, in therapy. As to these alternative systems' special truths, Fiedler has evidence to show that (92, p. 38) "the nature of the therapeutic relationship is a function of expertness rather than school." In the writers' view, we have a long way to go beyond current pre-metric theory before psychotherapy can achieve a reasonably potent and reliable practice based on explicit scientific principles.

We cannot deal experimentally with anxiety and neurosis, we cannot even converse and reason about them with complete intelligibility, until these terms are operationally and meaningfully defined and measurable. Theory and therapy are in a confused state essentially because one cannot be quite sure what another is talking about when he says "anxiety" or "neurosis." *A fortiori*, it is impossible properly to check theoretical propositions concerning these concepts, or to evaluate claims for certain therapies, etc. As several methodologists have pointed out (86, 156, 214), a vital step towards improvement is to place instruments for meaningful and exact measurement in the hands of the clinician.

This does not by any means make it all the psychometrist's or academician's show. Clinicians must have a major share in devising and using the measuring instruments. "Brass instrument" psychologists easily forget that science does not consist only of controlled, univariate (one-variable-at-a-time) experiment, with easy-to-control, hence, usually unlifelike, test situations and stimuli. Science consists also of statistical analysis of happenings occurring in their natural life settings, as the clinician knows them, utilizing lifelike stimuli and reactions, which the clinician well understands. We think the clinician is right in believing his data are at least as important and relevant as laboratory data. He is wrong only if he fails to use precise measuring instruments dealing with meaningful and central psychological concepts, or if he fails to treat the resulting lifelike, multivariate data through the powerful multivariate techniques they require.

Our preference for clinical-type multivariate situations and reactions does not extend to clinical rating as the process for providing data in these situations. From simple correlations between different therapists examining the same patient, we know that the original clinical and diagnostic descriptions of a particular patient—the data from which intelligent treatment and theory should originate—can be pitifully unreliable in the case of neurosis, anxiety, and other mental disorders (6, 21, 64, 87, 152, 158, 197). One can achieve neither correct diagnosis of a particular patient nor the accumulated firm data from which penetrating general laws can emerge without test instruments to measure the alleged instinctual-need levels, the dynamic fixations, the severity of neurosis, the response of anxiety level to life problems, the degree of conflict taking place in a particular set of dynamic traits, and so on. While these test instruments initially must be checked against clinical-rating diagnosis (see Chaps. 4 and 5), we hope to show that they can eventually surpass such ratings in their yield of penetrating, precise, cross-checkable evidence.

In brief, for the ailments of pre-metric theory and therapy our prescription is: (a) precise, standard, clinically meaningful tests rather than anecdotal observation providing the main source of data and (b) multivariate statistical techniques dealing directly and exactly with complex situations and persons rather than piecemeal univariate approaches. This position is expanded in Chapter 3, and it is implicit in all the laboratory work upon which this text is based (44, Chap. 1). As to its necessity, many historical illustrations could be given of unnecessary arrests in therapeutic technical advance and of programmatic research projects which have gone astray by failing to follow these canons of method.

Summary

1. The severity of the problems of neurosis and anxiety in regard to both clinical practice and society in general is highlighted. These disorders are very prevalent now and may even be on the increase, despite the large amounts of money and effort expended on techniques for dealing with them.

2. Evidently, present qualitative pre-metric approaches are not sufficiently effective and must be strengthened by a metric approach, which employs powerful, multivariate statistical techniques to analyze relationships between precise, standard, clinically meaningful measurements.

CHAPTER 2

CONCEPTS OF ANXIETY AND NEUROSIS IN PRE-METRIC THEORY

Pre-metric theories of anxiety and neurosis contain valuable leads for our approach, if only because they pose clinically important questions and propose hypotheses as to the nature of anxiety and neurosis which can eventually be reformulated and tested precisely by means of multivariate measurement methods. As already noted, the best of the pre-metric theories are supported by brilliant, painstaking observation, but we can only hope to suggest the most salient and relevant points in this brief review. Further, we shall not hesitate to expand pre-metric conceptions by suggesting points that, from the vantage point of our own methodological position, logically ought to be made, even though current pre-metric theory does not deal with them.

Some Clinically Important Theoretical Questions Concerning Anxiety and Neurosis

No complete theory or therapy can afford to ignore questions of the following type. Further, most pre-metric theories have tried to deal with at least some of them.

1. Do neurosis and anxiety arise from insoluble conflict and increase with the intensity of conflict?
2. Are they associated with special kinds of family upbringing, specific childhood trauma, and some definable constitutional tendencies toward psychic regression?
3. Is there evidence of unbalanced development of the dynamic systems of ego, id, and superego in the development of neurosis?
4. Can the changes associated with the precipitating situational conflict be distinguished from the neuroticism-contributing changes produced in early life?
5. Do neurosis and anxiety depend partly on conflicts inherent in a culture and vary in incidence among different cultures and ages accordingly?
6. Does a prolonged neurosis or anxiety state produce certain biochemical, endocrine, and/or autonomic dysfunctions responsible for somatic illness?
7. Do changes in anxiety level occur in incipient neurosis and incipient

psychosis, and what are the consequences of raising anxiety in the process of overcoming resistances during the therapeutic, integrative process?

8. Can one demonstrate changes in ego strength, anxiety level, amount of total repression, and amount of unintegrated drive occurring from the time of the initial diagnostic testing until the final post-therapy, discharge examination of the neurotic?

In considering questions such as these, it at once becomes evident that logically there exists a prior set of questions which need to be answered. These questions concern the very nature of concepts such as anxiety, neurosis, ego, etc., which we were employing as distinct, conceptual units in the above questions. In the first place, if we are to probe the ground beneath our feet with Descartian thoroughness, on what basis do we assume there is only *one* anxiety—just because popular speech happens to use one word or because all neurotics are of one type, with one origin and one fate? Indeed, if we are to begin at the beginning, we must first ask questions of the following type:

1. Is there more than one kind of anxiety, e.g., free and bound, healthy and pathological, conscious and unconscious, somatic and central?
2. Are there certain somatic and physiological associations with a prolonged anxiety which are not part of the pattern of anxiety in temporary states?
3. Is anxiety to be considered a true motive or drive and, if so, what is its relation to other motives? For example, can separate measurements be made of general and of different specific motivation levels, including that of anxiety?
4. Can anxiety response be distinguished from stress reaction and even from certain fatigue response patterns and, if so, by what measurements and with regard to what differences of sequelae?
5. Are rises in anxiety level in one person signified by the same manifestations that permanently distinguish one person constantly at a higher anxiety level from another person at a lower level?
6. Is there such an entity as "general neuroticism," the severity of which can be measured regardless of the particular psychiatric syndrome classification, temperamental slant, or specific source of conflict involved in each case? That is to say, is there a single dimension of increasing neuroticism or is neurotic maladjustment a multi-dimensional thing, its severity being contributed to by several independent dimensions of expression?
7. Are neuroticism and psychoticism only increasing degrees of the same thing or are they quite different?
8. Is anxiety distinct from neuroticism, i.e., can neurotics sometimes show low anxiety and non-neurotics a very high anxiety level?
9. Do the manifestations of neuroticism and of anxiety appreciably modify themselves in persons who differ in constitutional tempera-

ment and personality structure, in accordance with their pre– or extra-neurotic background?

10. What are the relations of measures of degree of neuroticism and anxiety to the disease process, and to the usual course of conflict? Can such measures be used to give more intelligent guidance in the course of psychotherapy, much as a clinical thermometer or blood chemistry can in general medicine?

Our interest is second to none in unravelling the theoretical, causal, developmental, and therapeutic questions which form the first list above, but we believe the more urgent need at this juncture in clinical research is with true scientific realism to first solve the more fundamental questions composing the second list.

Almost unnegotiable gulfs of divergent opinion now separate clinicians on the immediate issues in the former list, and understandably so, because immense, enthusiastic clinical experimental concern with these questions has yielded contradictory or unintegrable results—inevitable when no one paused to examine the logically antecedent questions. We believe that the experiments described in this book will provide substantial, confirmed answers to most of these antecedent questions. This will not, in turn, immediately yield answers to the first group or even allow reinterpretation of existing research results in variables in these areas, but it will inaugurate a new phase of research in which answers to these questions can be more rapidly and surely obtained.

Answers to the types of questions posed above will necessarily involve theoretical propositions concerning the nature and origins of neurosis and anxiety. Let us try to summarize briefly what pre-metric theory has to say about such questions, first for neurosis, then for anxiety.

Neurosis: Précis of Pre-Metric Clinical Conceptions

Included here are some relatively elaborate psychological, sociological, and physiological theories based on clinical and qualitative types of observation. These include Freudian, Adlerian, Jungian, and Neo-Freudian writings, each too voluminous, widely known, and well documented to require any separate resumé here. But generally, it is now implicit in almost all schools of psychiatric opinion that neurosis is a condition of dynamic maladjustment, arising from a personal history of traumatic experience and faulty attempts at adjustment, aided perhaps by some constitutional weaknesses. The hypothesized roles of particular standard sources in the personal history may differ greatly from case to case, but certain common causes and sequences occur generally, as follows:

1. A general proneness to instinctual (ergic) regression, fixation, and failure to mature can be perceived. This is due partly to constitutional tendencies, but also largely to environmental blocks and absences of opportunity in relation to later phases, or to fixations on earlier phases through overexcitation and undue attachment, etc. For Freudians, these fixations and failures to mature in dynamic interests are primarily described in the sex and aggressive drives and with respect to bodily erotic zones and the movement from auto– to allo-erotic interest.
2. These fixations are themselves the primary cause of conflict since, in themselves, they fit badly into the adult and cultural demands, but, secondarily, they detract from the energies needed for cultural adjustment.
3. Conflict of a situational kind is another prerequisite regardless of whether it arises from the fixations or from other causes. Generally the fixation conflict is accentuated by, and projected into, current environmental frustrations, such as occur especially at certain periods, e.g., adolescence and cultural pressure points.
4. Generally, the conflict is eventually largely internalized between ego, id, and superego structures. If it is "acted out," this is usually not the original conflict but symptomatic behavior from the internalized conflict.
5. The ego, developmentally impoverished by fixation, conflict, and repression, reacts with a variety of rigid defenses, outstanding among which is repression, whereby the conflict may become not only internalized but unconscious. The neurotic symptoms are eventually an unconscious compromise for the combined dynamic expression of repressed complexes, the superego demands, and the needs of other dynamic structures.

These basic notions are used, more or less, by a majority of therapists, many of whom are nevertheless not at all prepared to accept all the further elaborations believed by the psychoanalytic school per se. The existence of conflict-adjustive attempts involves concepts which can also be supported by animal experiments, notably in the work of Mowrer (162), Masserman (150, 151), Liddell (137, 138), and others. The resulting concepts, resting on both clinical and experimental guidance, have been integrated into a single scheme in Cattell's framework of "dynamic crossroads" (33, pp. 209 ff.) which can be used as a basis for definition of the exact stage of any conflict-adjustive process in experimental work or clinical diagnosis, enabling the conflicts of individual neurotics to be analyzed systematically for their differential emphases of expression, course, and state of arrest.

Neurosis: Pre-Metric Clinical Conceptions Restated in Terms of Hypothesized Dimensions Distinguishing Neurotics from Normals

The above pre-metric observations and hypotheses on the nature of neurosis can be reviewed and reinterpreted as dimensions along which clinically judged neurotics are alleged to differ from normals. Such a restatement will increase our understanding of the mechanisms involved and also convert pre-metric observations into hypotheses which can be examined metrically in the chapters which follow. For our method yields factors which are to be understood as dimensions and we shall thus be able to test empirically and exactly whether or not the hypothesized dimensions actually exist.

Pre-metric observations suggest that neurotics and normals will differ along the following dimensions, which may also be regarded as sources and/or manifestations of neurosis:

Dimension involving degree of general (instinctual) regression. Presumably, this dimension can be caught experimentally in measures of interests. Such a factor, derived entirely as an hypothesis from psychoanalysis, should show itself at the non-regressive pole in dynamic measures of maturity of sex interest, freedom from auto-erotic and narcistic fixations, etc.

Dimension involving degree of maladjustment relative to the environment. This could be expressed in measures of real difficulties vis-à-vis the environment, but in analysis of behavior manifestations it might show either as a sense of discouragement or as a high level of unsatisfied ergic (drive) tension. The deprivation and frustration might express itself substantially in anxiety but also, initially, in anger, sense of dissatisfaction, irrational and inappropriate emotionality, and, finally, discouragement and disheartened performance.

Dimension expressing the degree to which the individual has internalized conflict. If the person "acts out" in delinquent fashion a repeated non-adjustive attack on barriers, the full conditions for neurosis formation do not immediately exist. There must be inhibition to convert conflict into anxiety or symptoms arising from repressions. Involved in this dimension, we should expect introvert tendencies, indeed, possibly several distinct temperamental and character sources of a tendency to general inhibition of action—though not necessarily the "inhibition on special appropriate occasions" which arises from realistic, suppressive ego action.

Degree of ego weakness displayed in ego defenses and symptom formation. In the essential psychoanalytic theory which we have incorporated here, there is a vicious circle of causation: ego weakness causes conflicts to be handled by savage repression instead of adaptive suppression and sublimation, and in turn the ego is weakened through the losses of libido resulting from the failure to incorporate these ergic forces in the ego. Such a causal structure could easily appear as two or three distinct dimensions in tests, e.g., a dimension representing a strong tendency to conform and repress, a dimension representing the signs of ego impoverishment, and perhaps a dimension representing the amount of unconscious anxiety resulting from the repressions as expressed in manifestations of general personality impoverishment. Descriptively, we would expect measurements showing inability to control emotional impulse, fear of decision-demanding situations, tendency to adopt rigid defenses, feelings of inability to cope with the environment, poor mobilization of abilities and other personality resources, inconsistency of behavior, signs of defective integration, and rapid, unjustified fluctuation of attitudes and feelings.

Dimension involving degree of neurotic debility. This would represent impairment of function through exhaustion effects at a neural-physiological level, as the result of prolonged anxiety and conflict. This dimension might embrace losses of psychic energy due to repression and exhaustion symptoms. Among the latter, one would expect essentially what have sometimes been called neuresthenic symptoms—inability to concentrate, poor memory, effort intolerance, increase of errors in performance, etc.

Dimension involving degree of anxiety. Many clinicians, though using two different words, actually tend to evaluate neuroticism and anxiety as the same or nearly the same thing in any given patient. Psychiatric conceptualizations of neuroticism and anxiety are likewise often hard to distinguish (42, 5, pp. 31 ff.). However, in normal persons in everyday life, levels of neuroticism and anxiety should be substantially different, if we are correct in believing that anxiety is often a response to real environmental threats and dangers (pp. 14 f.). Moreover, forms of neuroticism exist which show disabling symptoms quite distinct from characterological anxiety (notably, conversion hysteria, with its *belle indifference* at least to conscious anxieties). These alone would suffice to define neuroticism as something not identical with free conscious anxiety.

The complexity of mechanism suggested by pre-metric theory as to the source and nature of neurosis indicates that it may be a multidimensional phenomenon. That is, neurotics may differ from normals on more than one distinct personality dimension and we have hypothesized here at least six such dimensions, only one of which is anxiety. As we turn now to pre-metric theories concerning anxiety, we must be alert to the issue of whether anxiety, too, can be subdivided into component dimensions, or whether it is a genuinely unitary conception in any sense.

Anxiety: Précis of Pre-Metric Clinical Conceptions

First, we will discuss anxiety in relation to other concepts such as conflict, fear, drive in general, and stress; then we will discuss distinctions made within the anxiety concept itself, e.g., free *vs.* bound, conscious *vs.* unconscious anxiety. Elsewhere, the authors have presented somewhat differently oriented concepts of anxiety (42, 66).

ANXIETY IN RELATION TO OTHER CONCEPTS. *Anxiety and drive in general: the dynamic origins of anxiety.* Common speech frequently equates anxiety with desire, e.g., "I am anxious to do so-and-so," and sometimes there is a wisdom worth investigating in common speech. However, in this case, evidence from clinical and everyday observation, from experiments on the higher mammals, and from comparative anthropology strongly suggests that the basic drives in man are several—hunger, sex, fear, self-assertion, gregariousness, curiosity, etc.—and that anxiety is probably only a secondary derivative in some way from experience of the action of these primary drives in certain punishing or depriving situations. Moreover, empirical evidence shows that there are at least nine distinct drives in man and mammals (44, Chaps. 11 and 12; 32, 50, 56, 61). Therefore, it is hard to see how anyone today can base careful motivation research on the theory that anxiety is the whole motive power in learning or any other activity. Our position is that the concept of total motivation is different from that of clinically defined anxiety.

Anxiety, fear, and deprivation. Granted that anxiety is not to be identified with total motivation or drive in general, two questions still remain: (i) Is anxiety identifiable with, or similar to any special, primary drive, such as fear-escape, sex, and so on? (ii) Can anxiety still be bound up intimately with occurrences in the history of any or all drives, even though it is not itself all drives?

As for the first question above, pre-metric theory has tended to place anxiety in intimate conceptual relation with the fear drive. Fear is defined here as a specific quality of introspected emotion, with a specific neural (hypothalmic) and visceral reaction pattern. It is the affective aspect of the escape erg[1] (drive), just as other primary emotions are the affective aspects of other ergs. Parenthetically, the development of a specific affect, accompanying conation, expressed in a particular behavior pattern working toward a particular ultimate goal, presumably has the utility of permitting conscious associations of perceptual and orectic events, for the event can then be tied to a peculiar character of conscious feeling. It is hypothesized that the escape erg is innately set to be triggered by perceptions of fearful, dangerous objects (large, hard, swift-moving), and to favor some modes of responses, such as freezing or rapid flight rather than others, though almost any response can be learned. However, only the empirical investigation of early unlearned behavior can decide what are the original, general fearful stimulus characteristics by which, by conditioning and reward (safety), the emotional and conative response transfers to other situations. At present, investigation points to complete strangeness, enormous size, speed of onrush, appalling loudness and suddenness, overwhelming power, sense of loss of support (falling), infliction of pain, etc., as central among the perceptions initially triggering the fear reaction.

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[1] Henceforth, we shall refer to a specific drive as an *erg*, e.g., the sex erg, in accordance with a technically precise concept developed elsewhere (33, pp. 195, 199), and to drive-in-the-abstract as general *ergic tension*, which is primarily a product of need strength and situational stimulation (44, p. 546).

As defined here, anxiety differs from fear, introspectively and presumably physiologically, by being a response to precursory signals of perception of the true fear objects. It is a tentative alerting by cues and symbols rather than by concrete, present danger. Consequently, it has the associated qualities of uncertainty, and of lasting longer. The anticipatory character, the fact that signals are not invariably followed by what they signal, the uncertainties about stimulus generalization, the future reference instead of the present percept—all suffice to modify the quality, intensity, certainty, and duration of the fear response pattern into the pattern which we are accustomed to call anxiety.

However, we are relatively uncertain of the process of modification from fear to anxiety, due to lack of application of effective structural analytic tools such as factor analysis, and lack of psychometric study of cultural-ecological data covering the normal life span of human development. The greatest riddle concerns the way in which anxiety may be generalized as a response pattern to threat of loss of ergic satisfaction, as well as to the above-mentioned pain and danger stimuli which we know have always inherently triggered fear. The attempt to handle this by saying that extreme ergic deprivation is itself painful, seems a relatively feeble argument, involving a play on the word "painful," for in civilized man, most needs such as hunger and thirst do not reach the level of being physically painful, and many a man who dreads poverty has never experienced real hunger pangs. Unless quite different mechanisms are invoked, therefore, the explanation by learning, which leans on proof never given that in the average person deprivation has commonly been a precursor of pain, must give way to the supposition that the fear response is inherently reactive also to ergic deprivation of any kind. This is not biologically improbable, for we recognize that pugnacity, so similar to fear in its anger affect and physiological response pattern, is innately triggered by frustration of any other erg. But it is surprising that animal experiment and human introspection have not more definitely given empirical proof that deprivation and the experience of inordinate, unsatisfied, inner ergic tension directly provoke fear.

Two alternatives present themselves: to abandon the notion that all anxiety is derived and modified from the innate response pattern of fear, substituting the view that it is a response *sui generis,* anticipating unsatisfied tension and excessive excitation of any ergic need. There is an introspective resemblance of anxiety to the agitation and restlessness of unsatisfied need, and certain physiological conditions, such as high adrenalin and high acetylcholine, produce restlessness—something which many would call "anxiety."

The second alternative is to rest the whole association on the high statistical likelihood of deprived behavior having, in personal history, sooner or later picked on a real or imagined obstacle, having then turned to anger and attack which was followed by painful, fear-evoking punishment. The frequency of such a sequence has been reasoned elsewhere (33, pp. 219 f.). There it is supposed that anxiety does not arise through deprivation until the γ "dynamic crossroads," when the sorely deprived animal has assaulted the obstacle to satisfaction and been severely punished by pain, not deprivation (see Chapter 12, pages 310–11). The apparent universality of this experience in all cultures and ecological subdivisions may suffice to account for the subjective experience of deprivation becoming a danger signal to excite anxiety; and for a signal of future possible deprivation therefore in turn becoming a provoker of anxiety. Without space or data to pursue this further, we shall settle for the basic hypothesis that one source of anxiety is deprivation, and we will specifically include fear, i.e., deprivation of the need for security, along with other ergic needs.

Anxiety and conflict. Pre-metric clinical theories tend to view anxiety, at least in some cases, as a product of conflict. Anxiety may arise originally from outside threats, in the form of fear. But as fear finally appears, tied to vaguer memory of past punishments and the uncertain anticipation of punishment (when a frequently punished drive reaches tension levels demanding fresh expression), it acquires the quality of anxiety. As in Freud's original notion of transference—acceptable now at least as description—the situation is then as if libido, or aggression, when repressed, transform themselves into anxiety. Anxiety can thus be spoken of as if it arises directly from pressures and conflicts of mutually unadjusted dynamic systems within the individual, e.g., id and superego.

Anxiety and stress. In numerous reported researches, the terms "anxiety" and "stress" are used almost interchangeably. This seems to us an instance of investigators allowing themselves to be deceived by word connotations from the popular and even poetic use of "stress." There is, in fact, very little to be gained by further discussion of verbal habits, except perhaps to note that the stress concept more often centers on definition based on type of stimulus, especially the stimulus which produces anxiety-like response. However, as described more fully in Chapter 3, our approach is to concentrate on defining a concept first by means of its *response pattern,* assimilating stimuli to the concept only as they demonstrably evoke that response pattern. Our own evidence, discussed later in more detail, reveals a stress response pattern which is factor analytically distinct from the anxiety response pattern, though perhaps sometimes secondarily a result of anxiety response. This stress response pattern is primarily a reaction to physiological insult to which different kinds of psychological stress may sometimes contribute, and it is similar to the well-known non-specific physiological stress response pattern extensively and brilliantly studied by Selye (199, 200).

VARIETIES OF ANXIETY AS CONCEIVED CLINICALLY. Generally, most existing theories and descriptions tend to imply that anxiety is a single entity which has (a) a dynamic origin distinct in quality from primary drive, even from the very similar need for security (fear), but possibly derived from them; (b) a unique quality of introspected experience; and (c) a specific pattern of physiological expression (at least in anxiety neurosis and anxiety hysteria), though the resultant overt behavior may be endlessly protean.

Many theories of anxiety tend to state or imply that anxiety is a single entity. On the other hand, clinicians in particular tend to attach many adjectives to anxiety, e.g., bound, free, unconscious, etc., and some theorists go on to assume empirically independent varieties of anxiety corresponding to these adjectives—at least implying that anxiety is not a single functional entity. It is therefore important that we define and discuss some of these implied varieties of anxiety, and their interrelationships as presently conceived in pre-metric theorizing. We can only attempt a summary of alternatives, recognizing that some pre-metric theorists may organize these alternatives somewhat differently.

Realistic-situational and characterological anxiety. A major a priori difference to be kept in mind affecting the quality and fate of anxiety is that between realistic-situational anxiety and characterological anxiety. Realistic-situational anxiety arises in response to real situational threats and comes and goes with them. On the other hand, characterological anxiety rises and falls with processes within the individual, little or poorly related to immediate external threats. *Realistic-situational anxiety* is directly produced by signals of possible danger or deprivation occurring in the environment at the time, e.g., thunderclouds, a sign that one's sweetheart may love another, an inkling that one's preparation for an exam is inadequate, the eve of a battle in which one may be killed. (Conceptually, it differs from fear in that it is a response to precursory signals of danger, not to immediate present danger.) It may last a long while—as long as the situation persists—but tends to change realistically with the situation. Variations in the level of such anxiety in different people should be largely a function of differences in the level of actual threat to which they are subjected. Such variations should follow an irregular life course, except in so far as some life epochs present more physical, economic, moral, etc., danger than others. Generally, situational anxiety should be relatable to stimuli and may thus be differentiated from other forms by its temporal, situational changeability. Also, it is conceivable that, being closer to fear, it has special physiological response qualities.

Contributions to the level of *characterological anxiety* arise not externally as above, but internally from (a) temperamental differences, such as dispositional timidity, giving greater reaction to exactly the same situations, and (b) differences in aspiration levels and goals causing the same situation to threaten more loss. Such sources may also be viewed as contributors to situational anxiety in the sense that the anxiety may still need to be triggered off initially by external stimuli and can also vary with the intensity of these stimuli in any given person. However, since these traits determine individual differences in the magnitude of response to the same external stimuli, and since they tend to magnify anxiety response out of all proportion to the danger in any given threat, they are best considered sources of characterological anxiety.

The level of characterological anxiety does not necessarily have any relation to immediately present, objectively observable danger. That is, although internal dynamic conflict, or characterological anxiety, is traceable in the last resort to external experience, this experience may be historical, remote, and long embedded in the sentiments and complexes of the individual, so that he is reacting to signals of danger as he has known it, rather than to a fresh and realistic appraisal of possible danger in the present situation in relation to his personality resources. When he becomes anxious at contravening, in imagination, say, some superego prohibition, or in response to a restive impulse threatening the ego, he is at best reacting to an actuarial averaging of experience of what usually follows such behavior. Such anxiety will be much more correlated with ergic tension changes and imaginings in the individual than with the level of real external threats. It will be systematically greater in persons who have poor internal organization, and whose signal systems give an astigmatic perception of reality.

In summary, situational anxiety differs from characterological in having a higher precision of relationship to external threats and a lower relation to internal features of the individual personality. To this second operational test there is an awkward exception, namely the previously mentioned timidity of disposition, which operates to magnify both real-situational, and internal-irrational anxieties. Our view is that, other things being equal, such timidity will affect magnitude of anxiety reaction to perceived threat, not its tendency to co-vary with the presence or absence of "real" threat in any one person. If characterological should cover by exclusion, as here, all variance in anxiety not explicable by situational variation, then one must be careful to remember that it will cover (a) differences in *normal, adjusted personality structures,* notably temperamental reactivities to threat and sentiment and aspiration structures which decide how much is realistically threatened, as well as (b) differences in *irrational, unrealistic sources of anxiety.*

Bound and free-floating anxiety. One can define an anxiety which is "bound" in the sense of being a reaction occurring only in a specific situation or involving only a specific response as in some phobic or obsessional-compulsive behavior. However, in our view, bound anxiety need not be restricted to the pathological. Some bound anxiety is realistic, in the sense of being attached to some specific object or appearing when some necessary adjustive task is neglected or denied. Regardless of pathological associations, we can in general contrast with bound anxiety free anxiety in which the person experiences anxiety without being aware that he can rationally attach it to any object or recollection. Free anxiety is here considered irrational and maladaptive in the sense that it implies repression of the cognitive links which associate the anxiety with its real causes. Such anxiety can also be physiologically produced, as by adrenalin injection, or it may be associated with psychosis, as in certain schizophrenic attacks, agitated melancholia, etc., the mechanisms of which are not exactly understood at present. Statistically, one would expect experiences of free anxiety to coincide considerably with anxiety defined as abnormal or pathological, in the sense that free anxiety is excessive and unrelated or unrelatable to appropriate situational causes. Thus, free anxiety is usually pathological, bound anxiety and characterological anxiety may or may not be, and situational anxiety usually is not, since by definition it co-varies with actual environmental threats. The above a priori distinctions may or may not actually correspond to empirically independent types of anxiety, and even if statistically separable, they are likely to be correlated in their incidences. Thus, most free anxiety is abnormal or unrealistic, etc.

Conscious and unconscious anxiety. The distinction between conscious and unconscious anxiety is another apparent exception to the trend of considering anxiety as "one thing." Also, it does not fit the conception of anxiety as a unique quality of introspected experience (p. 14), for it requires that anxiety still exist even though not consciously introspected. In fact, unconscious anxiety is one possible inference from the clinical observation that conscious anxiety comes and goes while the external behavior or somatic dysfunction usually associated with it sometimes persists. Unconscious anxiety seems to be a legitimate construct and has been particularly helpful in bringing the psychosomatic disorders into the general dynamic explanations of neurosis. However, the great bulk of existing theorizing about anxiety hinges on conscious, introspectively reported anxiety, not on patterns of behavioral or physiological test response which can exist regardless of conscious experience. Paradoxically, this is true even of unconscious anxiety which has been inferred largely from appearances, reappearances and metamorphoses of introspectively reported anxiety, rather than from any adequate proof of a behavioral or physiological pattern which can appear without conscious anxiety. However, a considerable body of research exists on psychosomatic illness, interpreted as the somatic manifesto of inability to deal with anxiety consciously (153, pp. 67 ff., p. 79). Moreover, some clinicians have noticed and specified a pattern of unconscious anxiety as a pattern of somatic disturbance by showing that this pattern is not only a concomitant of conscious anxiety, but remains when conscious anxiety abates (105).

In summary, we have the clinical distinctions between anxiety which is free or bound, conscious or unconscious, realistic or unrealistic, and situational or characterological. The question now is: will a priori distinctions be confirmed empirically as statistically separable, relatively independent dimensions of personality, or will the concept of a single anxiety entity remain tenable? The single entity view is supported by the apparent convertibility of one type of anxiety into the other. That is, for a particular person, free anxiety may readily become bound, as the clinician succeeds in opening up the associations which trace it to its symbolic or concrete situational stimuli. Conversely, under the dissociations of fatigue or drugs, anxieties may arise in detachment from their binding sources. Therapy also claims to bring back to consciousness (perhaps first as free and later as bound) anxiety which has been in a relatively permanent inaccessibility in the unconscious. Insofar as transformations in these "anxieties" can be achieved, it would seem that the clinician can think in terms of forms or alternative expressions of a single conceptual entity rather than in terms of distinct functional entities or radically different species of anxiety. Thus, clinical concepts might still permit us to expect a single anxiety factor resulting from statistical experimental analysis of anxiety manifestations.

Anxiety: Pre-Metric Clinical Conceptions Restated in Terms of the Hypothesized Dimensions in Anxiety

As discussed above, it is quite possible that anxiety is essentially a single entity and hence will appear in our empirical research as a single factor-dimension. On the other hand, it is worthwhile to analyze the distinct sources which might contribute to differences along a single empirical dimension of anxiety, or appear as distinct dimensions or subdimensions in experimental-empirical analyses of anxiety. Therefore, just as we did for neurosis, we will review some pre-metric theorizing about the nature of anxiety and restate it as hypotheses about dimensions which factor analysis might discover discriminating between clinically judged high anxiety cases and normals. Factor-dimensions may also be interpreted as influences or sources (44, pp. 301 ff.; 29, pp. 78 ff.) and this will be the interpretive emphasis in the following discussion, which will lean heavily on Cattell's previous systematic integration of pre-metric conceptions (29).

Level of ergic tension as an anxiety source-dimension. The term "ergic tension," refers to the tension resulting from unsatisfied drive of any sort. If unsatisfied ergic tension from deprivation ("libido") were directly transformed into anxiety, or if for other reasons the relation were universally one of simple proportion to situational deprivation, ergic tension would be the same for all people in the same given setting and would not rank as a characterological and irrational source of anxiety. However, in clinical experience ergic tension seems to (a) vary from person to person in ways not due to stimuli alone, and (b) excite differing degrees of anxiety even when at the same level.

Characterological differences in anxiety from this source cannot be understood only by reference to the average ergic tension level itself. First of all, we must consider the type of drive involved. Thus, the arousal of anxiety should be greater per ergic tension unit in ergs which tend to be more frequently punished in our culture, such as sex and pugnacity. Freud's notion of "unconscious sexual and aggressive phantasies" provoking "guilt" belongs here. Secondly, there is the manner in which the person handles his tension level; for example, the degree to which he is able or willing to give it expression, and the extent to which he generalizes it from harmless drives to undischarged drives whose discharge would lead to punishment. Personality characteristics other than ergic tension level itself may therefore help to determine the degree of anxiety resulting from a given ergic tension level (see also the paragraph below), but the above discussion still permits us to expect some correlation between anxiety level and measured ergic tension level.

AMOUNT OF EGO WEAKNESS AS AN ANXIETY SOURCE-DIMENSION. Ego weakness presumably contributes to anxiety in two ways: (a) through the ergic tension level, because a weak ego is unable to effect realistic discharge and reduction of ergic tension, and (b) through "fear of overthrow of the ego," which should be proportionately more acute in a weaker ego, and which we know leads to rigid defense mechanisms. The former will already have been taken care of at one remove in measures of ergic tension itself (see above). It is an open question whether anxiety about overthrow of the ego (fear of loss of control, reputation, etc.) is a partly innate development dependent on the existence of loss of control as an innate fear trigger,[2] or whether it is wholly learned from past catastrophic punishment for loss of control.

DEGREE OF SUPEREGO STRENGTH OR GUILT PRONENESS AS AN ANXIETY SOURCE-DIMENSION. Psychoanalytic theory holds that the generation of anxiety in internal conflict is powerfully contributed to by the superego. Indeed, the ego defenses are regarded as a product of anxiety arising from the interaction of three sources: id pressure (essentially as above), ego weakness (essentially as above), and superego strength. As Mowrer suggests (164), an increasingly strong conscience should generate no increased anxiety if it encounters no resistances, but human nature being what it is, it always does, so both the strength of the superego and the strength of the ergic resistances should appear as independent components. Moreover, it is probable that even when the influence of real transgressions is small, anxiety arises from the provocations constituted by unconscious phantasies in the id, known directly by the unconscious elements in the superego, and condemned in proportion to the strength of the superego. Other dynamic exchanges and products besides the production of anxiety may occur in internal conflict, though we shall take note of these other products only in so far as they may be confused. Thus, the superego apparently threatens not only punishment and deprivation of affection, which as punishment and deprivation generate anxiety, but also provokes that self-abasement and sense of worthlessness which contribute the quality of guilt and depression to certain "forms" of anxiety. At a pre-metric clinical level one can form the opinion that superego action is probably very important in bringing other ergic emotional qualities into close juxtaposition with anxiety.

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[2] The writers have in mind some instances where the strangeness of some loss of control at the physiological level, e.g., the loss of ability to control a muscle, has produced immediate anxiety.

Degree of threat susceptibility as a temperamental source-dimension. A glaring omission from much clinical, dynamic theorizing is failure to recognize that the magnitude of the anxiety response, besides being partly a function of the degree of actually existing threat is also to some extent a function of the individual's specific proneness to threat reactivity. As noted before in our discussion of "varieties" of anxiety, this is primarily a source of characterological anxiety rooted in the individual personality rather than in stimuli. In any complete multivariate experimental treatment, we should expect some appreciable fraction of the individual variability in anxiety level to be traceable to one or more general personality factors in the person, probably temperamental and constitutional, which simply magnify his threat reactions. It is probable that such factors will act to increase the magnitude of both characterological and situational anxieties, the latter in the sense of magnifying reaction to an actually existing threat.

Breadth of self-sentiment involvement as a source-dimension—greater with more anxiety. Like threat sensitivity, this is a characterological anxiety source primarily in the person, not in the stimulus situation. Other things being equal, a person with more irons in the fire is more vulnerable to a wider range of threats. For example, a person with intelligence enough to have genetic interests has something to be worried about in atomic bomb fallout that is beyond the anxieties of the mental defective. It would be oversimplifying (and contrary to data reviewed later) to infer from this a general correlation between anxiety and intelligence or knowledge, for these latter also bring their compensating assurances. But when situations go awry one would expect greater situational anxiety, as magnified by characterological sources, in persons of broader sentiments and larger goal aspirations.

The final two possible anxiety dimensions to be hypothesized stem most directly from Cattell's theorizing (33), though they obviously relate to certain generally recognized clinical phenomena. Research must decide whether they are best included in the concept of anxiety as special forms or, alternatively, recognized as clinical phenomena distinct from anxiety but having some degree of resemblance to it.

Degree of deflection strain as an anxiety source-dimension. This concept relates to the notion of deprivation, previously discussed in connection with anxiety. The concept was derived on theoretical grounds by Cattell and defined in a dynamic law, No. 10 (33, p. 643), as follows: "Modes of learned perception and response can be arranged in a gradient according to their degree of dispersion from the innately easiest path. Greater dispersion arises . . . with greater deprivation and excitement in the original deprivation or blocking underlying learning. . . ." For example, an escape from fire which initially involved heading toward the fire would involve more deflection strain than the more natural course of running away from it. This concept resembles the psychoanalytic definition of sublimation but is broader, including the acceptance of a substitute path as well as a substitute goal. That is, the concept includes deviation from certain innately preferred paths as well as goals. The degree to which an individual acquires a given deflection strain level will be a function of two things: (a) the individual's general dynamic rigidity, with more rigid persons experiencing more deprivation strain in a given case of goal or path-to-goal blocking, and (b) the number and intensity of the historical occasions on which the individual's environment has compelled him to adjust by deviating from the innately easiest path. These two, dynamic rigidity and history of environmental demands, might combine to produce a deflection strain pattern which is virtually or completely identifiable with anxiety, or, on the other hand, the deflection strain pattern might be distinct from anxiety.

DEGREE OF COGNITIVE-DYNAMIC INVESTMENT STRAIN AS A SOURCE-DIMENSION OF ANXIETY. This also derives originally as a purely theoretical concept, implied in dynamic law, No. 11, (33, p. 643) as follows: "Increase in the number of intermediate cues and subgoals in reaching a goal, as well as increase in the fineness of cognitive discriminations to be maintained, and increase of the length of time that intermediate anticipatory mental sets (deferred action to cues) have to be maintained, occasion a strain of total cognitive dynamic energy. This is probably specifically shown in the decreased mobility to learn new material. . . ." In popular language, we would talk about the cultural complication of our lives, and the difficulty of having to remember and attend to an increasing number of minutiae in achieving and maintaining ergic and self-sentiment satisfactions.

Cognitive-dynamic investment strain is one of the strains associated with what has been called "long-circuiting" (33, p. 643) of impulse, i.e., increased length of path to ergic goals through many cultural sub-goals. Among persons of the same intelligence, memory capacity, etc., individual differences in the load assumed or in the capacity to support complication may show up as a dimension in manifestations that often are included vaguely, at present, in the concept of anxiety. The sources and associates are similar to those which cause deflection strain: that is, greater punishment, blocking of simple goal paths, and a probability of greater conflict will, in general, be associated with greater long-circuiting of impulse. The expected pattern of response will stem from the "stress" of having to maintain in operation so many cues, and so many inhibitions of more direct action and thus may prove to be more closely akin to inhibition or depression than to anxiety.

Summary

Pre-metric concepts of anxiety and neurosis are reviewed and reformulated as source-dimensions, in a form suitable for later testing by empirical multivariate analysis.

1. Some clinically and logically important questions about the nature of anxiety and neurosis are stated—questions which theory has attempted to answer or must eventually answer.

2. A précis of clinical conceptions of neurosis suggests the following source-dimensions operative in neurosis: ergic (instinctual) regression, maladjustment relative to environment, internalization of conflict, ego weakness, neurotic debility, and anxiety. It is suggested that neurosis is determined by multiple distinct sources, whose sequence and interrelations in the course of neurosis are discussed.

3. A précis of clinical conceptions of anxiety compares and relates the concept of anxiety to the concepts of drive-in-general, fear, deprivation, conflict, and stress. The following clinically-conceived varieties of anxiety are also discussed: realistic-situational and characterological, bound and free-floating, and conscious and unconscious. Whether these a priori varieties of anxiety will actually appear as functionally distinct factor-dimensions is left an open question, but the following source-dimensions or sub-dimensions in anxiety are hypothesized: ergic tension, ego weakness, superego strength, threat susceptibility, breadth of self-sentiment involvement, deflection strain, and cognitive-dynamic investment strain.

CHAPTER 3

METHODOLOGY FOR AN EMPIRICAL MULTIVARIATE ANALYSIS OF ANXIETY AND NEUROTICISM

Resumé of Methodology to be Used, Contrasted with Traditional Approaches

In the preceding chapter, an essentially a priori analysis of pre-metric concepts of anxiety and neurosis led us to hypothesize certain dimensions which might distinguish neurotics or highly anxious persons from normals. In subsequent chapters we shall test these hypotheses by statistico-empirical methods. But before we come to grips with experimental data, a digression into method is necessary. We will orient to the most essential points before plunging into more detail.

Methods of getting information. Current clinical research and practice depend heavily on clinical rating. While we too use rating measurement, we concentrate on *tests* of questionnaire and objective type. *Questionnaires* depend primarily on the individual's self-aware report on himself, although items can be disguised in purpose. *Objective tests* are disguised in purpose or otherwise constructed so as to minimize the degree to which the individual can deliberately or unconsciously distort the personality information yielded (44, 48, 189), e.g., systolic pulse pressure or galvanic skin response as measures of personality. Important for both theory and practice is the fact that both types of test are scored "objectively" (usually by key); that is, as contrasted with ratings, all observers will agree on the score to be assigned a given person's performance. Questionnaires and objective tests also have an obvious practical clinical and research advantage in that, relative to ratings, they are easy and quick to administer and score, usually requiring relatively little skill or special training on the part of the administrator.

Analysis of data into factor-dimensions. Clinical observers have described a number of behavioral patterns and syndromes in the area of neurosis and anxiety. Often, such patterns are first approximations to the truth of what-goes-with-what, but they are bound to be rough and incomplete because of the limited capacity of the human mind to perceive, remember, and generalize accurately the precise relationships between many personality characteristics over a set of persons observed. This rough analysis of going-togetherness by the unassisted individual, we propose to supplement by exact statistical methods for determination of correlation and dimensions in correlation, employing the almost unlimited memory and relation-educing capacity of the electronic computer.

When current clinical research does use test measurement, there is a deplorable tendency to define a concept operationally in terms of a single test; thus, anxiety is what test X measures. Clearly, this can lead to as many concepts of anxiety as there are alleged tests of anxiety —and there are many of these, with almost every investigator seeming to have his own pet test. At any rate, without knowing the relations between the tests we cannot know the relations between the proposed concepts or the relations between the manipulative experimental data on anxiety from test X and test Y, etc. Thus, in what we shall call *univariate* research (one or a few variables at a time), we are commonly faced with contradictory findings about what anxiety is and does, what conditions associate with neuroticism, etc.

Our *multivariate* approach first finds the empirical relations among the tests, by exact correlational and factor analytic methods, only then attaching a label to what is common to these tests as revealed in a factor-dimension. Moreover, as we shall see, factor analysis allows us to determine exactly what proportion of the information in a given test applies to a given factor-concept such as anxiety, and what proportion applies to other concepts, as defined operationally by these empirical factor-dimensions. The fact is that practically all known single tests are found to be involved in several distinct factor-dimensions. If, as we believe, factor-dimensions are the most legitimate basis for defining concepts, this means that each test can help to define several concepts operationally, but cannot completely or definitively represent any one concept.

GROUNDS FOR IDENTIFYING FACTORS WITH CLINICAL CONCEPTS. Concepts are to be attached, not to tests, but to factors, which are precisely and empirically proved dimensions of correlational going-togetherness among tests. But how are we to decide which concepts are to be identified with various factors? That is, what are the grounds for identifying one factor with anxiety, another with neuroticism, etc.

First of all, it is important to analyze correlations between the broadest possible coverage of measurements, sampling, insofar as is possible, a wide array of putative tests of anxiety and neuroticism, tests which on "face valid" grounds seem to involve behavior that clinicians have called anxious or neurotic. Broad test-coverage enables us to represent test-wise as many conceptions of anxiety and neurosis as we can, before deciding factor analytically what is common to them. It is also designed to cover the total personality structure in accordance with the principle that anxiety and neurosis cannot be understood as phenomena isolated from the rest of the personality. We consider it axiomatic that the etiology, course, and expression of anxiety and neurosis are importantly affected by other source-dimensions in the individual's personality. These other source-dimensions are therefore represented in tests.

Multivariate analysis of the above range of tests yields factor-dimensions, some of which, more than others, will involve "face valid" anxiety or neuroticism characteristics. These dimensions will then qualify as factors of anxiety or neuroticism on *trait definition* grounds; that is, the anxiety concept is attached to the factor most eminently involving behavior which clinicians agree in calling "anxious." However, trait definition is only a secondary criterion for identification of a concept with a factor.

The primary criterion is *type definition:* the concept of "neurosis" will be attached to a factor only when scores on that factor significantly discriminate between clinically judged neurotics and normals—the same holds for defining anxiety in terms of scores for clinically adjudged higher and lower anxiety-level persons. Type and trait definition are not identical. For example, adults (by type) can show childlike behavior (trait), and a neurotic person (by type) may fail to show behavior which clinicians agree appears "neurotic." Type definition will be our primary criterion because it seems to orient more toward what is stable and reliable in clinical judgments. Thus, "critical incidents," such as institutionalization and appearance for therapy, help to define the neurotic type, while there seems to be more disagreement about what is a "neurotic" behavior.

Type and trait definition aim to allay an unfortunately common doubt among practitioners as to the value of tests. Most will agree that key-scored tests are convenient, easy to administer, and have the value of engaging agreement among observers as to the score-value of a performance. But many wonder if such tests are deeply meaningful—if they are getting at what is clinically important in the person. In our multivariate approach both type and trait definitions serve to base our work firmly on clinical conceptions of what is neurotic or anxious behavior and who is neurotic or anxious. This is just as it should be. However, type definition is more than simply a means of providing convenient psychometric substitutes for intuitive evaluations. First of all, with properly designed research, sampling the range of clinical judgers and potential judgees, the discriminating factor-dimension will pull out only that which is demonstrably *common* to the sphere of clinical judgments of neuroticism or anxiety, omitting the purely idiosyncratic. This is an important feature since clinical judgments are notoriously unreliable under certain conditions. Secondly, factors which discriminate between normals and neurotics or high anxiety cases may turn out to involve behaviors and interpretations which unassisted intuitions have never before perceived in neuroticism or anxiety.

More Detailed Discussion of Statistical Method

With the above overview in mind, let us plunge into a more detailed and technical methodological discussion. First, we need to understand more about what a factor is, since factors are clearly central in our approach.

RESUMÉ OF FACTOR ANALYTIC EXPERIMENTAL METHOD. Nontechnical discussions of factor analysis are available for those who wish to read further (35; 96; 100; 107, Chap. 16), and the Glossary at the end of this book defines basic technical terms. The logic of factor analysis is initially the central logic of science itself. The experimenter observes a mass of co-varying phenomena and attempts to infer the nature of the single influence operating from behind the scenes, to produce observed single directions or dimensions of co-variation (factors). In genetics, for instance, this logic led to the concept of genes (Mendel first called the genes "factors"), and in biology, to the concepts of hormones and of vitamins. Apparently, some concrete thinkers couldn't believe in the existence of the inferred "abstractions," genes, hormones, and vitamins until they were actually, physically isolated. Some psychologists have the same reservations about accepting the inference of personality and ability factors. Yet curiously enough, to the eye of the trained logician, the scientific status of these concepts is the same as much that such "realists" accept without question.

The general nature of factor analysis is well known. In the simplest design one measures a sample of people on each of a number of test or rating variables. Scores on the variables are intercorrelated in every possible pairing of variables to form a correlation matrix. From the sign and magnitude of the correlations one can tell what-goes-with-what and thus check on the original hunches. For example, if reported feelings of anxiety, magnitude of hand tremor, degree of arrest of stomach movements, and ratings of "withdrawn behavior," correlate positively and significantly in every possible way (six coefficients among four variables) we should have evidence of a correlation cluster or syndrome that would bear out many clinical hunches.

Although correlation clusters give evidence of underlying functional unities, a single cluster can arise from more than one influence, and a further examination of a correlation matrix which we call factor analysis can reveal how many and what kind of independent influences are really at work. The non-mathematical reader can take for granted the processes through which the correlation matrix is carried to obtain the factors and their loadings by particular variables, or he can read on the techniques elsewhere (35, 215). The process ends in a *factor matrix*, showing the extent to which each of the original variables is *loaded on*, i.e., correlated with, each of the factors.

This operation is first of all a parsimonious one, since a large number of variables can be described in terms of their correlations with (loadings on) relatively few factors. For example, the interrelations among 100 variables can usually be described well by their loadings on about 10 factors, while without factor analysis, the same information would have to be approached as an overwhelming, bewildering array of almost 5,000 intercorrelations among variables.

In addition to its value as a parsimonious description of human complexity, a pattern of test loadings shows how much of the variance of each variable is accounted for by the given factor and can thus lead to inferences about the nature of the factor. For example, a factor loaded by hand tremor, introspections of dread, etc., has a strong claim to be called anxiety and similarly Spearman's factor *g*, loaded by tests of problem-solving, reasoning, classification, vocabulary, etc., became the operational representative of intelligence. When a factor has thus been isolated initially in an area of behavior, a more definite hypothesis as to its nature emerges suggesting other untried variables which, if the hypothesis is correct, should be positively related (loaded), negatively or inversely related, or unrelated. These hypotheses can be checked by further factor analytic experiments.

Factor analysis is not restricted to dealing with naturally occurring individual differences in responses. It can be combined with manipulative experiment, as when one brings presumed anxiety-producing stimuli to bear and tests people before and after, correlating stimulus strength with changes in the responses. It can also measure one person on several variables over a long series of occasions and correlate the series, bringing out functional unities of fluctuation and sequence in that person. Essentially, factor analysis' advantages over univariate experiment are: (i) clinically, it can deal with the global concepts, e.g., relationships among many variables, in which the clinician is interested, (ii) logically, it represents a concept operationally by a whole pattern of variables, thus tying it down with far greater certainty than by one operational test representation, and (iii) statistically, it usually accounts for most of the variance of the variables studied, instead of leaving the greater part as unknown variance or error.

As for the last point, our experience has been that virtually every known single test measures at least several distinct personality dimensions, not just one, as is sometimes claimed for a test. The number and nature of the dimensions a test does measure can be ascertained only if the test is factor-analyzed along with many other tests sampling the range of personality dimensions.

TECHNICAL STANDARDS OF THE FACTOR ANALYSIS. Gross differences in reliability of inference and in the particular conclusions which can be drawn from a factor analysis may hinge on seemingly specialized or narrow technicalities. Therefore, those familiar with factor analysis will be interested in a more technical statement of the procedures and standards in the twenty-odd major factor analytic and other studies on which this book is based. Most of these studies observed the following canons:

1. Representation of background factors other than those on which we were concentrating, by a catholic choice of test variables.
2. Sampling of variables and number of subjects[1] suitable for the degree of definition required in hyperplanes and loadings.
3. Centroid extraction, usually using Burt's method of estimating communalities (24) and, in most cases, repetition of the factor analysis to give convergence of communalities by iteration.
4. Testing for completeness of extraction by several simultaneous tests, and rotation of at least one, generally two, more factors than are indicated.[2]
5. Rotation for oblique simple structure (rotating out any excess factors), carried out blindly, i.e., without knowledge of which variables load in what factors. Rotating for meaning (to get patterns as near as possible to one's existing ideas of structure) is no better than allowing the cat of science to chase its own tail. In any case, most instances where an experimenter claims thus to have verified his hypothesis are never examined statistically, and, if so examined, prove generally to fall far short of the agreement alleged.

   Rotation was stopped usually after between twelve and twenty-five over-all blind rotations when the total variables in the hyperplane (±.10) reached a plateau as shown by lack of increase over three successive rotations.
6. Testing of significance of simple structure by Bargmann's index (9).
7. Working out of angles (cosines) among reference vectors and inverting to obtain angles (correlations) among factors.

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[1] Here and subsequently, the word "subjects" or the abbreviation "*S*" refers to the persons tested or otherwise studied in research.

[2] Our position (46) is that any natural correlation matrix contains an indefinitely large number of factors—more than the number of variables, *n*. Ideally, *n* should be extracted and rotated, upon which most factors would end as small or error factors; but rotation is time consuming, and we compromise by aiming to take out 95 per cent to 99 per cent of the common variance, which is possible using far fewer factors than test variables.

8. In five studies, a second-order factor analysis was carried out on the above correlation matrix among primary factors to obtain second-order factor structure.

Other experimental designs and standards employed. Once the general patterns were established according to the technical standards of full-scale factor analysis described above, it became possible to check and intensify understanding of these patterns by employing "extension" analysis. This is essentially a simplified version of factor analysis where variables are correlated directly with an estimate of the factor based on variables known to load it highly in full-scale factor analysis. It can be shown that a variable's correlation with a factor estimate in extension analysis closely approximates the loading it would achieve on that factor in a full-scale factor analysis. All studies contributing to the tabular information in this book were full-scale factor analyses except for eight extension analysis studies, and several special comparative studies using t-ratios, to be described later.

Appendix I briefly describes each of the main studies contributing to this book. More detailed technical statements on individual factor analytic studies have been removed from the present integrative study but will be found in adequate form relegated to the specific article publications on which this book rests. For our present purposes it suffices to know that the above factor analytic procedures will yield an agreed-upon, objective, and unique resolution of the correlations among a mass of observed variables into a limited number of broad psychological, conceptual dimensions or influences, capable of accounting for the complex relations among the variables. Thus, with proper technical conditions, factor analysis succeeds in making, with mathematical precision, scientific objectivity, and the tireless memory storage of an electronic computer, that resolution of a mass of observations into the underlying functionally unitary concepts which the clinician tries to achieve (and *can* achieve up to a point) in his own head. The Illiac digital computer can compute and organize in the factor analytical mode well over twenty thousand correlational relationships at once, and even this computer is becoming obsolescent. However, it is unlikely that even an aging computer such as this can ever be matched in these operations by mere man. For, as Eysenck's discussion shows (87, p. 24), the unassisted human brain is not a very good instrument for assessing, weighting, and combining many items of information.

Demonstrating the Existence and Interpreting the Meaning of a Factor

Hypotheses of existence and of nature. The discovery of the number of functional influences at work, and the picking out of the actual variables most highly influenced by each, still leaves us with the intellectual task of interpreting the nature of the factor. This involves the application of much general knowledge and insight and cannot be left to mathematical procedures. For example, if test variables *a* and *b* load a factor positively, *c, d,* etc., not at all, and *h, i,* etc., negatively, we must ask: "What is the psychological influence that could be powerfully present in behavior *a* and *b,* completely inoperative in behaviors *c* and *d,* and operating to reduce (negative loading) variables *h, i,* etc.?" Typically, the first time a factor loading pattern is discovered it is regarded only as a hypothesis of existence of a particular defined pattern—simply an hypothesis that in other psychological data and situations the same organic pattern will reappear. Usually, the first check on this hypothesis is a second experiment containing, among others, the same set of variables, with a new sample of persons. But often, at this first or other checks, the initial pattern is also used as a basis for interpretive hypotheses about the nature of the factor which could produce such a pattern of effects. Such hypotheses are checked as one adds new crucial variables, the expected loadings on which (positive, negative, or zero) can be stated before the experiment, by inference from the hypothesized nature of the factor.

Factor indexing by number and name. It is important to keep separate in one's mind these two kinds of hypothesis testing: (i) the sheer reality or *existence* of a pattern whatever its nature, and (ii) the conceptual *interpretation* predicting that certain, as yet untried variables will load in certain ways. The existence of the pattern peculiar to the factor can usually be satisfactorily checked in two or three experiments, while the psychological interpretation usually requires much longer—typically many years. Therefore, Cattell has suggested a Universal Index (U.I.) system (45), for easy non-interpretive reference to the actual factor pattern as a simple hypothesis of existence. By this U.I. number, a particular factor can be referred to during the period in which it remains in limbo—proven to exist but not yet finally interpreted—without that premature over-generalization and fixation which arise from the implication of verbal labels. For even simple, tentative descriptive names inevitably tend to imply interpretations, and gradually deceive both the name-giver and others into accepting certain connotations which have never been proven of a factor. Indeed, the debates of vanity, of semantic circularity, and always of futility, which have so frequently occurred in psychology, well exemplify nearly four hundred years later than need be Bacon's warning of the power of words to keep thought in unconscious bondage (**Novum Organum,** Book I). Accordingly, we have simply numbered as U.I. 1 through 15, the fifteen ability factors agreed upon by the committee on ability factors (97), with the known personality factors numbered as U.I. 16

through 36.[3] Personality and ability factors have been placed in the same series because no accepted criterion has yet been found to separate crucially ability from other personality dimensions.

U.I. numbers have generally been accompanied by temporary, descriptive labels only. Of course, the factors of the scientist could be kept permanently under symbols, and where words in popular speech are hopelessly vague to begin with, it may be wise to control them. If one does not coin new terms, the alternative is either to import the imprecision and downright errors of folklore contained in popular terms or to perpetuate ancient philosophical entanglements with pretentious technical terms. However, just as Spearman's factor g is a demonstrable factor right in the middle of all kinds of behavior we call intelligent and might just as well be called "intelligence," so, too, the factor or factors found in the area roughly demarcated semantically and clinically by current usage as "anxiety" have the best claim to be called the anxiety factor or factors. It should be understood that precise use of anxiety by psychologists henceforth means this factor or factors.

FACTORS AS RESPONSE PATTERNS. A widespread present naïveté is the belief that anxiety, stress, etc., can be recognized and defined by attachment to some single stimulus or stimuli which the experimenter happens to consider fearful, stressful, etc. But our correlational survey of behavior attaches the interpretive label "anxiety," "stress," "sex," etc., first to a response pattern for, by our measurement of response variability to standard stimuli, it is only the parts of a response pattern that can be shown to go together. Intercorrelations of stimuli will not yield meaningful correlation clusters, since stimulus incidence is by-and-large an accident of the culture pattern. The question of what stimuli are anxiety stimuli can only be settled later—after anxiety response has been defined—by finding which stimuli in fact provoke this particular response pattern (see Chap. 11). Thus, our subsequent distinction between anxiety stimuli and stress stimuli rests on the prior demonstration that these exist as two distinct response patterns. Once a factor is isolated in responses, a battery of tests can be set up to measure it and the factor can then be used as a dependent variable in all kinds of manipulative experiments, statistical analyses of background evidence about its origin, and longitudinal studies on its consequences. The resulting findings about the factor's genetics, learning course, response to training situations and other stimuli, influence on physiological activities, etc., are an indispensable supplement to response data in testing hypotheses about its nature.

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[3] The examples given here are factors found in *objective tests*, the full label preface of which would be U.I.(T). The same system exists for factors in *questionnaire measures*, and these are prefaced by the symbols U.I.(Q). In each case the U.I. system is used for the reasons given above, but the *empirical* relations are somewhat complex between factors named by the U.I.(Q) and U.I.(T) systems. This point is discussed further on pp. 58 f. and elsewhere (192).

SEQUENCE AND COMPREHENSIVENESS OF MEASUREMENT COVERAGE. Our survey of neurosis and anxiety will begin with behavior-rating and questionnaire measurements, leaving the performance or objective test medium until later. The reason for this sequence is that most existing clinical and experimental discussion of neuroticism and anxiety is in these more immediately manifest rating and questionnaire introspective terms. Consequently, interpretation of factors in terms of test loadings can only proceed confidently if this life behavior and introspection first enters the factorization. Identification of objective laboratory test factors can be made later, partly by showing that they correlate sufficiently with the rating and introspective data factors. The psychometrist will probably describe this procedure as finding factors in the criteria before validating against them the factors in the tests.

One of our fundamental methodological points is discussed elsewhere under the general theme of choice and sampling of variables in factor analysis (35, especially pp. 344 ff., pp. 331 f.). The point is that in factor analytic or any research one should enter with a stratified, general sample of *other variables besides those which one is specifically interested in structuring.* This goes back to the logician's point that one only knows and can define X when one knows also the things that are *not* X. In another realm, we have the poet Browning's reminder: "What know they of England who only England know?" There is a threefold sense in which this need for a deliberately wide sampling of variables applies to factor analysis:

1. If one considers a particular set of variables, say, neurotic, and wishes to know if a single neurotic factor explains them, one should still include a number of other variables, for it is conceivable that in addition to whatever factor is obtained in the favorite variables, another pattern may be found in variables which someone else might consider neurotic, and which could therefore also count as a neuroticism factor. For example, investigators have talked of a single memory factor only to find later, in sweeps through wider realms of data, second and third factors with almost equal claim to the title.
2. Even if only one factor is found in an array of putative neuroticism tests, it is necessary to bring out its character by contrasting it with other factors and with other variables known not to load it.
3. Accurate rotation to simple structure is not possible without many "irrelevant" unloaded variables in order to form a clear and ample hyperplane[4] for the factor containing the variables in which one

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[4] A *hyperplane* is a set of variables unloaded on a factor, but determining its position in factor space, since the factor, when rotated, is placed at right angles to this hyperplane. A more technical definition of the concept may be found elsewhere (35).

is interested. For example, one cannot obtain a unique resolution of a factor of verbal ability if every test in the matrix involves verbal ability, leaving no hyperplane.

It has been necessary to air these technical methodological points here because many factor analytic clinical studies have ignored them, with the result that we are compelled to disagree radically with their rather specific conclusions on matters of considerable clinical importance, such as the existence of a single neuroticism factor. In our view, many of these studies have extracted too few factors in order to meet the bias of some oversimplified clinical theory, or they have been too narrowly clinical in their view of personality and have consequently attempted to rotate where all their variables were abnormal, symptomatic observations. That is, they have fallen into the rotational impasse created by taking all "figure" data and leaving no "ground" against which to contrast it. This same exclusively clinical prescription in sampling of variables has led to factors being defined wholly within the severely but obscurely distorted distributions of abnormal populations.

Background in the Normal Personality

RESEARCH STRATEGY AND COVERAGE. In researches concerned with generating structure and perspective in a wide field of discussion, it is vital for abnormality to be seen in perspective by using defined groups of deviants against a background of larger samples of normals. It is perhaps the special feature of the studies of neurosis, anxiety, and clinical, abnormal phenomena reported here that they are planned from the beginning to study these clinical phenomena within a *comprehensive framework of established normal personality dimensions.* We will thus be able to view neurosis and anxiety as continuations of well-understood normal phenomena, rather than as mysterious, qualitatively discrete phenomena, *sui generis.* The comprehensiveness of coverage theme returns here in terms of persons rather than tests. But comprehensiveness of test coverage also plays its part here, enabling us to understand the etiology and expression of neurosis as affected by the total personality of the individual, whether or not he is in the normal range.

The last five years of research on central dimensions of the clinical domain are the culmination of twenty years of research of which the first ten or fifteen were almost wholly concerned with adequate definition of the functional unities in the total normal personality. This background of knowledge about the total normal personality will be kept in view constantly and therefore must be briefly described. It has recently been surveyed, integrated, and theoretically discussed elsewhere (44), and the brevity of the present discussion assumes that readers will turn there for whatever they feel needs expansion. The foundational researches systematically covered the three possible modes (or media) of psychological observation: (1) behavior rating in everyday life (*L* data, henceforth, for Life-Record data), (2) questionnaire self-report data (*Q* data, henceforth, for questionnaire response), and (3) objective, laboratory test data (*T* data). The first studies always began with *L* and *Q* data, because, as just pointed out, this permits ready interpretation of factor analytic findings in terms of concepts from clinical lore (which is couched in the same *L* and *Q* language). More specifically, it ensures that the factors found will be correctly placed semantically as introversion, dominance, etc., for they will have emerged from areas of behavior customarily so described in our culture. Secondly, the approach through *L* and *Q* data facilitates deliberate, stratified sampling of the whole personality sphere of behavior, as defined elsewhere (29, pp. 215 ff.), since initially this is easier to accomplish systematically in verbal terms.

A very great number of variables in *L* and *Q* data have been covered in fifteen years of research, in some thirty factor analytic studies on some three thousand subjects. Coverage of the personality sphere in ratings began with all the personality descriptive terms (roughly four thousand) in the dictionary, as collected by Allport and Odbert (3), and in addition all technical, psychological trait labels, such as oral sociability, projective defense, etc. After correlation and factor analysis of these in varied groups, subsequent research settled down to a condensed but comprehensive, stratified sample of the personality sphere consisting of forty-two rating variables. These seemed to be the minimum set for covering some fifteen or sixteen independent factor-dimensions which would block in most of the personality structure as known by ratings. In the questionnaire realm, if we include the items covered in Cattell's 1946 survey (29) of all investigators whose factors were carried forward into our factorings, the range of meaningful questionings (items) has been just as exhaustive as the coverage of rated behavior. By the last factor analysis of the 16 Personality Factor test (62), actual correlation study had covered some four thousand questions. Our build-up of items, guided by factors found first in the rating field, extended the questionnaire pool of 1946 most notably into non-neurotic directions—for the normal personality field had been most neglected in the early "neurotic inventories."

GENERAL PERSONALITY DIMENSIONS IN RATING AND QUESTIONNAIRE DATA. The separate factoring of *L* and *Q* data realms has consistently yielded about sixteen factors in each medium, all but a few of which can be matched by actual correlation from *L* to *Q* data. At present, there are only four well-confirmed factors present in questionnaires that have never been clearly evident in ratings. These have been labelled Q_1, Q_2, Q_3, and Q_4. Factors found in both questionnaire and rating measurement have been labelled alphabetically, A through P, in roughly descending order of variance. A U.I.(*Q*) numbering system also exists, paralleling the objective test factor U.I.(*T*) index system, but habit and ease of remembering have favored alphabet capitals for the rating and questionnaire factors. Actually, this lack of parallelism in the indexing has proved a blessing in disguise, for the *T* data factors often seem to be operating at a second-order level relative to *L* and *Q* data factors. That is, a group of alphabetic (*Q* or *L*) factors usually corresponds to one U.I.(*T*) objective test factor.

The existence of each of the above sixteen questionnaire and rating factor-dimensions has been confirmed by replication in at least three independent researches, with blind rotations (see 44). The factors have also been enriched by a great deal of criterion correlations (occupational, group dynamics, clinical, educational), principally through the 16 P.F. test (62), and at least half the patterns have progressed to the point of receiving definite, dependable interpretations, e.g., factor A is the Cyclothymia-Schizothymia dimension of temperament; factor C seems strongly to resemble the ego strength pattern, as described psychoanalytically; F is Surgency-Desurgency, an important component in extraversion; G suggests the clinical concept of superego strength; Q_4 is Ergic Tension or level of undischarged drive, etc. Even for the others, there are generally clear-cut interpretive hypotheses, though many do not necessarily fall as close to concepts already existing in pre-metric research. Recently, the analysis has been carried down to infancy, in three stages, by factorings at 11–12 years, 7–8 years, and 4–5 years (58, 75). The patterns have been consistently replicated, proving a functional continuity of factor dimensions over the developmental range.

Brief title descriptions of all sixteen *L* and *Q* dimensions appear in Table 4–2, and the nature of each dimension is discussed at relevant points throughout this book and elsewhere (44).

GENERAL PERSONALITY DIMENSIONS IN OBJECTIVE TEST DATA. As noted before, the attempt to isolate and confirm the major dimensions in the total normal personality has proceeded separately for rating and questionnaire data on the one hand, and objective, laboratory-type test data on the other. Like the questionnaire-rating research, objective test research began with as comprehensive a sampling as possible of the known potential realm of objective test measurements. The hypothesis of existence was then tested for each of the factors which emerged from factor analysis of these data; that is, they were checked to see whether each response pattern, whatever its nature, would reappear in essentially similar form through repeated experiments. To date, the hypothesis of existence has been well-confirmed for about seventeen or eighteen of the indexed objective test dimensions, U.I. 16 through U.I. 36, with only a few of the higher-numbered factors not yet replicated in three or more researches.[5] Finally, interpretive hypotheses as to the nature of existing patterns were tested by checking predictions of which variables should or should not load a given factor, and by correlations of the factor with clinical, occupational, and other criteria. Thus far, interpretive hypotheses have been well confirmed for only a few factors.

More detailed discussion of objective-test factors will be deferred until Chapter 5 and is also available elsewhere (39, 44), but we should note here one important fact: There are at least eighteen objective-test factors, four of which are quite confidently identifiable with four groups of rating and questionnaire factors. Most of the sixteen dimensions in *L* and *Q* data are substantially involved in one or the other of these four groups. It follows that the unmatched, leftover objective-test dimensions must penetrate to realms of normal personality never before glimpsed in the ratings and questionnaires on which clinical psychology has traditionally depended.

Summary

The methodology to be employed in gathering and interpreting data is described in detail. (Methods for data interpretation and for further research are discussed in Chapters 12 and 13.)

1. Data will be gathered, comprehensively covering personality in the rating, questionnaire, and objective test media of measurement.
2. These observations will be correlated and factor analyzed by exact statistical methods to yield factors (sources, dimensions) describing and summarizing the correlations.
3. The existence or reality of these factors can be demonstrated by their repeated occurrence in separate experiments involving different samples of persons and test variables.
4. Interpretation of the meaning or nature of the factors will be based on (a) analysis of what is commonly present in associated (loaded) variables and absent in unloaded variables, and (b) criterion associations, especially clinical ones. Specifically, the clinical concepts of anxiety and neurosis will be attached to factors by means of *trait definition* (factor involving behaviors which clinicians consider "neurotic" or "anxious"), and *type definition* (scores on the factor significantly discriminate between normals and clinically judged neurotics, or highly anxious persons).

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[5] Ability factors U.I. 1 through U.I. 15 are certainly objective test factors, but for purposes of the present treatment will not be considered personality dimensions.

5. Factor analysis and related methods are described in some detail, with requisite technical standards. Emphasis on response rather than stimulus patterns, and indexing systems are also discussed.

6. It is stressed that factors cannot be properly interpreted, and neurosis and anxiety cannot be properly related to the total normal personality, unless a very wide range of measurements are made and analyzed by multivariate methods.

7. The number and nature of factor-dimensions found in the total normal personality is briefly outlined.

8. Our approach differs from typical clinical approaches mainly in that it emphasizes precise multivariate analysis of a comprehensive array of test response measurements, as contrasted with emphasis on relatively unsystematically organized rating observations, and speculations based thereon.

CHAPTER 4

TYPE AND TRAIT DEFINITION OF NEUROTICISM AND ANXIETY: QUESTIONNAIRE AND RATING DATA

In the previous chapter an attempt was made to give a better understanding of the essential logic of our approach. In terms of that logic, we are confronted with the question: Which empirically discovered factors identify with the clinical concepts of anxiety and neurosis? This question will be answered in two ways. The primary criterion is *type definition;* a factor deserves the concept-label "neurosis" or "anxiety" only insofar as scores on it significantly discriminate between normals and clinically judged neurotics or highly anxious persons. A secondary criterion is *trait definition;* a factor deserves the concept-label "neurosis" or "anxiety" only insofar as it involves characteristics which clinicians generally agree are neurotic or anxious. Type definition will not necessarily yield the same identifications as does trait definition, since, quite conceivably, factors which actually discriminate between neurotics and normals can crucially involve characteristics which have never before been considered neurotic. Following our canon of comprehensiveness of coverage, every known personality factor-dimension will have its chance to qualify as identifiable with the anxiety or the neurosis concept, on trait or type definition grounds. This chapter deals with the questionnaire and rating personality sphere, first for neuroticism, then for anxiety. The next chapter deals similarly with objective test evidence.

Trait Definition of Neuroticism in Terms of Questionnaire (Q) and Rating (L) Factors

The question here is: In what factor or factors do characteristics which clinicians term "neurotic" fall? In other words, which factors have "face valid" neurotic content? In factor studies with samples of normals, ranging from well-adjusted to neurotic, there is good agreement of *L* and *Q* data in showing in some factors "neurotic" rated or introspected behavior, for example, irrational emotionality, instability, defense mechanisms of various kinds, excessive worrying, feeling of one's unpredictability, inadequacy, conflict, hypochondria, general dissatisfaction with self, phobic, compulsive, and somatic symptoms, etc.

Factors containing such characteristics are shown in Table 4–1. It would be interesting to set out each of the 42 rating variables, and each of the roughly one hundred questionnaire response items which have neurotic quality and are scattered over the Table 4–1 factors, but economy of space dictates that we refer the reader to the lists of actual items elsewhere (62; Chaps. 4, 5, and 6 in 44; Chap. 15 in the present text).

TABLE 4–1

TRAIT DEFINITION OF NEUROTICISM: RATING-QUESTIONNAIRE FACTORS WHICH SHOW FACE VALID NEUROTIC CHARACTERISTICS

Factor: Alphabet Designation and Title		Neurotic Content by Inspection
C−	Low Ego Strength	Maladjustment and dissatisfied emotionality
D+	Excitability	Mind-wandering, restlessness, impatience
F−	Desurgency	Depression
I+	Premsia	Inability to face emergencies, and ratings of anxious sensitivity
J+	Coasthenia	Fatigue, obstructive independence
L+	Protension or Suspiciousness	Lack of trust, some compulsiveness
N−	Naiveté	Undisciplined emotions, not alert or objective
O+	Guilt Proneness	Worry and remorse
Q_3−	Poor Self-Sentiment Control	Discouragement and self-devaluation
Q_4+	High Ergic Tension	High frustration-tension level

It may be objected that the personality sphere of rating and questionnaire variables chosen initially to cover the behavior of the normal range could not contain in sufficient profusion the more extreme forms of behavior in which neuroticism is most clearly seen. The definition of those factors which, though present in everyone, receive their extreme expression in the neurotic, benefits from including characteristics of a pathological kind and extension of the sample to people who show them plentifully. Accordingly, we will also consider the extrapolation of the above trait-defined neurotic factors in the abnormal samples, which have been surveyed and matched with "normal" factors elsewhere (44, Chaps. 4 and 5) in the researches of Degan (80), Eysenck (85), Cattell (44), Huffman,[1] Lorr, Jenkins *et al.* (142, 143, 144, 145), Wittenborn (229, 230), and others. These extensions certainly support the idea that the factors cited are indeed those concerned with abnormal neurotic behavior.

In the more extreme picture, C—, Ego Weakness,[2] appears to load principally psychiatric ratings describing "badly organized personality"; abnormal emotionality ("consistently depressive or hypomanic"); seclusive; upset by wartime separation (these are war neurotics); poor muscle tone and posture; long history of unadjusted behavior; weak, dependent personality; and, to a lesser extent, obsessional symptoms, fatigue, dyspepsia, tremor, anxiety and anxiety dreams, and hypochondria. What can be identified as the I or Premsia factor especially picks out hypochondria, effort intolerance, fainting fits, dyspepsia, poor muscle tone, and somatic anxiety (but absence of problems in the sexual field). The agreement of the essential nature of I factor with the Lorr *et al.* pattern (143) and others (44, p. 133) is striking.

Anxiety, depression, guilt, seclusiveness, irritability, and agitation characterize two factors in abnormal data which appear to be extreme expressions of O, Guilt Proneness, and F—, Desurgency. Eysenck's factoring (85) has apparently run our two factors into one here and places conversion hysteria at the opposite pole to the O+ and F— poles. At the O+ and F— poles, he finds narrower interests, less mature and responsible personality, tremor, somatic complaints, and precipitation of condition by domestic stress.[3]

Type Definition of Neuroticism in Terms of First-Order Questionnaire Factors

What questionnaire factors significantly discriminate between neurotics and normals? The study dealing with this problem, hereafter referred to as R9-Q, employs only questionnaire factors, but since these factors align quite well with rating factors, it can be extended to them with considerable confidence. In any case, rating data are valueless unless both normals and controls are rated by the same psychiatrists and in the same environment, and this condition appears never to have been achieved in a study reaching required factor analytic technical standards. Our treatment definitely prefers the standard scoring system and convenience of questionnaires.

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[1] Huffman, Phyllis. Prodromal factors in behavior disorders: relationship between prodromal factors and subsequently developed behavior disorders. (Provisional title of article in preparation.)

[2] Here and throughout this book, capitalization of a term indicates operational definition of the concept in terms of a questionnaire or objective test factor. Thus, the terms Ego Weakness and Anxiety capitalized refer to a specified empirically defined factor in each case, whereas ego weakness and anxiety refer to these concepts in a more general way, including the range of traditional psychological interpretations of them, with many possible operational bases, none explicitly given.

Another important convention is the use of signs, + or —, following the alphabetical or numerical designation of a factor, to indicate more + or less — of the characteristics involved in that dimension. Thus, C+ means more Ego Strength while C— means less Ego Strength (or, alternatively, more Ego Weakness).

[3] In connection with the anxiety-depression cluster, we believe that better agreement between the other investigators, notably as represented in the fine work of Degan (80), Huffman (footnote 1, 40), and Lorr (142, 143, 144, 145), and Eysenck (85),

In the R9-Q study, the 16 P.F. questionnaire (62) was administered to 201 adult neurotics, yielding scores on sixteen well-defined, functionally independent *Q* factors. The judgment placing a person as neurotic was made on clinical rating grounds, uninfluenced by psychometric selection procedures. Moreover, we did not interfere with the judgment in any way, simply accepting as neurotic whomever the clinicians designated as neurotic.[4] To get the maximum convergence of this sample of neurotics upon the general clinical meaning of neurosis, we followed canons set out elsewhere by Schmidt and Fonda (197), avoiding the bias of a single judge or sample by collecting cases from several distinct clinical and geographical sources, ten separate diagnostic source groups in all. The clinician or team of clinicians who decided that the psychoneurotic designation was justified for any one group was not the same as the clinician or clinical team classifying another group. Moreover, the diagnosticians for one group did not consult with the diagnosticians of other groups during this study. The ten component groups are described in more detail in Appendix I. Some groups included military personnel neurotics only, others civilians only; some groups had only private practice patients, other groups were from government institutions; some were outpatients, others institutionalized. Of particular interest is one group from England, whose 16 P.F. pattern agrees well with the American group, in spite of believed international differences in conception of neuroticism (see Table 4–2, footnote ***). Considering all the groups together, both sexes were well represented, there was a wide range in age, educational and socio-economic status, and the important sub-categories of neuroticism were fairly represented,

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is obtained when the latter data is re-rotated as done by Cattell, re-analyzing factors 1, 2, 3, and 4 as C−, I, F−, and O (28, p. 582) and thus accepting simple depressive and anxious depressive behavior as due to two distinct factors, F− and O+.

[4] Actually, we accepted all clinical judgments of neuroticism as our starting point, with the exception of one group in which (a) both the contributor and the writers were dubious as to the belongingness of most of the group members in the psychoneurotic category as presently defined by the *Classification Manual of the American Psychiatric Association* (5); and (b) there was a strong possibility of contamination of clinical judgment by support from psychometric data on the very 16 P.F. test with which we wished to compare clinical judgment. However, some of these cases, with the above reservations, are used to fill out the psychosomatic disorder category discussed in Chap. 7.

as shown below. Again, the segregation into neurotic syndrome groups was done by the clinicians, not by us, and the percentages following are in terms of the American Psychiatric Association's suggested categories (5). The percentages by syndrome type for our group of 201 neurotics are presented first, followed in parentheses by the percentages for an independent sample—the total on-books population of 485 psychoneurotics in all Mental Health Service Institutions in the State of Illinois as of June, 1958.[5] The values are: Anxiety Reaction, 41% (25%) of neurotics; Dissociative Reaction, 1% (2%); Conversion Reaction, 6% (8%); Phobic Reaction, 1% (1%); Obsessive-Compulsive Reaction, 5% (8%); Depressive Reaction, 11% (39%); and Other or "No Clinical Judgment Given," 35% (17%). This evidence suggests that, perhaps excepting the Depressive Reaction Category,[6] the syndrome proportions in our sample of 201 correspond tolerably well to those found elsewhere, and our sample is in this sense representative of neurosis in general, as it is recognized clinically.

Scores on all sixteen dimensions of the 16 P.F. were computed for all ten groups (Total N: 201) and converted to a ten-point standard score (sten) scale which, on a very large sample of adults (over one thousand on one form of the test, at least three hundred on the other forms), is standardized at 5.5 for normals, with each full point of sten deviation from that value equivalent to one-half a standard deviation. Inspection of Table 4–2 will demonstrate that the 16 P.F. pattern for the clinically judged neurotic groups agrees remarkably well from group to group in each factor being either above or below the population sten average of 5.5. A more precise index of both pattern and absolute level agreement in factor profile is r_p, the pattern similarity coefficient (31), which, essentially, is higher as both the pattern and absolute level of stens on all 16 factors are more similar from group to group (that is, between institutions, in this case). This coefficient was very high among the ten groups, ranging from +.30 to +.90 and averaging +.67 (.20 is statistically significant at the .01 level). The important point here is that clinicians working independently of one another, in widely separated institutional frameworks and dealing with a range of types of persons, still agree very well with one another on the actual (psychometrically measured) characteristics of persons they classify as psychoneurotic. In brief, there is an impressive degree of interclinician reliability (agreement) on the characteristics which questionnaires show

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[5] For these data in a personal communication, we are greatly indebted to Dr. Phyllis Huffman, Chief, Psychology Service, Illinois Department of Public Welfare.

[6] However, the combined Anxiety Reaction-Depressive Reaction frequencies are approximately equal for both samples, and this may be a better criterion here, since, as Chap. 7 shows (Table 7-2 and p. 128), these two categories do not seem to be too clearly distinguished in clinical judgments.

AT TEN DIFFERENT INSTITUTIONAL CENTERS: FROM THE 16 PERSONALITY FACTOR QUESTIONNAIRE

Sample Group Designation	Number in Group	Sten Values on First-Order Questionnaire Factor-Dimensions															
		A	B	C	E	F	G	H	I	L	M	N	O	Q_1	Q_2	Q_3	Q_4
ST	20	5.5	5.3	5.9	4.5	3.6	4.3	4.5	6.0	5.1	4.9	3.6	8.2	4.0	4.7	4.7	8.5
FO	27	5.6	5.3	4.2	3.9	4.1	4.5	3.7	6.7	5.7	6.1	4.4	8.3	4.7	6.1	4.1	7.9
P	10	5.1	4.6	2.8	3.9	4.1	4.7	3.1	5.9	7.7	7.5	5.8	8.9	5.6	6.6	3.8	7.7
W***	15	6.9	3.7	1.8	4.5	4.1	4.7	4.5	7.5	9.3	8.4	6.0	9.5	5.3	6.8	4.2	9.5
K1	48	6.2	5.3	2.2	3.2	3.0	4.2	4.3	7.4	8.4	6.5	5.3	9.0	5.4	6.1	4.4	8.1
K2	37	6.0	5.8	2.4	3.4	3.5	4.4	5.1	7.3	8.0	6.1	5.1	8.4	4.0	6.2	5.3	7.8
H	14	5.6	3.9	3.6	3.6	3.6	5.4	3.8	5.5	6.0	6.7	6.8	6.6	5.4	7.3	5.7	6.4
C	9	5.2	4.3	3.3	5.4	4.0	5.1	3.0	5.7	7.8	7.6	6.1	7.8	4.9	7.2	3.6	7.6
F	15	5.7	3.4	2.9	4.8	4.1	5.4	5.2	5.7	6.1	6.3	5.4	7.6	4.9	5.7	5.8	6.7
E	6	5.7	2.8	3.3	4.0	4.0	4.0	4.2	6.0	4.5	5.8	5.0	6.3	4.2	4.8	5.3	8.0
Average Total	201	5.9	4.9	3.1	3.9	3.6	4.6	4.3	6.7	7.2	6.4	5.2	8.3	4.8	6.1	4.7	7.9

*The Standardization of the 16 P.F., using a ten point score range, 1 to 10, places 5.5 as the value for the normal population on all factors. Each sten deviation from this value is approximately equivalent to one-half a standard deviation.

**Key to Questionnaire Factors Appearing Here (titles at positive or high score pole of factor):

A = Cyclothymia (vs. Schizothymia)
B = Intelligence
C = Ego Strength
E = Dominance
F = Surgency
G = Superego Strength
H = Parmia or Venturesomeness
I = Premsia, Protected Emotional Sensitivity, or Tender-Mindedness
L = Protension, Suspiciousness
M = Autia, Non-Conformity
N = Sophistication
O = Guilt Proneness
Q_1 = Liberalism vs. Conservatism
Q_2 = Self-Sufficiency
Q_3 = Self-Sentiment Control
Q_4 = Ergic Tension

***British group, from Winwick Hospital, Winwick, England. All other groups are from U.S., with only a few cases from Canada. Average pattern similarity coefficient (r_p) between British and other groups was +.57. See Appendix I, R9-Q study, for description of each group.

neurotic types to possess. Without this precondition of clinical reliability of type diagnosis we should never have been able to show that any factor-trait levels were stably associated with clinically judged neuroticism. However, high clinical reliability by no means permits us to dispense with questionnaire psychometric measurement, for the profile of psychometric factor-trait measurements allows us to discover and analyze characteristics in the neurotic person of which the clinician may never have been clearly aware through intuition.

Our calculations show that with the number of persons and sten system used here, a sten deviation from 5.5 of 1.0 or more will be highly significant statistically. (Actually, a sten deviation of .8 would achieve significance, but we wish to stay on the conservative side here.) In view of this, Table 4–2 shows that clinically judged neurotics are in general significantly lower than normals on Ego Strength (C—), Dominance (E—), Surgency (F—), and Resilience to Threat or Parmia (H—); and significantly higher on Protected Emotional Sensitivity or Premsia (I+), Protension (L+), Guilt Proneness (O+), and Ergic Tension (Q_4+).

In a general sense, these findings confirm the pre-metric hypotheses of Chapter 2. That is to say, they show the neurotic at a higher level of ergic frustration (Q_4), more disposed to inhibit the outward expression of his maladjustments, Submissive (E—), Desurgent (F—), Threctic (H—), and of poorer Ego Strength (C—), and Self-Sentiment development (Q_3—). Since no factor has yet been found corresponding to the psychoanalytic concept of ergic (instinctual) regression, no check is possible for that element in the hypotheses. Certain relatively new concepts are also introduced for later discussion, namely, in the finding that the neurotic is more Suspicious (L+) and more Guilt Prone (O+). The latter, however, may reflect the superego concept discussed as a pre-metric hypothesis in Chapter 2, p. 19. It also becomes necessary to ask more about the meaning of I factor—Premsia *vs.* Harria—which is a significant differentiator. For the moment we shall point out only that I factor is known to be largely environmental in origin, that it is connected with genuine (non-hysterical) somatic disturbances from emotion, and that it has been hypothesized to represent the effects of an overindulgent and unduly protective family environment.

To these problems of interpretation we shall return in due course and also to the use of these data in constructing a sensitive instrument for the questionnaire diagnosis of neuroticism (Chap. 15). For if we can distinguish neurotics from normals with such significance on individual factor-dimensions, the discrimination will be much more powerful when the scores on these essentially independent factors are combined in a pattern, such as in a discriminant function.

Type Definition of Neuroticism in Terms of Second-Order Questionnaire Factors

Meaning and nature of second-order questionnaire factors. Second-order factors are broader dimensions which thus often correspond more closely to common clinical evaluations and permit more facile discussion in terms of fewer clinical categories. Such second-order factors represent more massive organization of personality than is revealed in first-order factors, although, being more general, they cannot account for as much of the variance of specific instances of behavior.

The R9-Q results (Table 4–2) can also be interpreted in terms of such second-order questionnaire factors. The sixteen first-order *Q* factors we have been discussing are correlated to some extent, though not as much as the original variables loading on them. For example, $C-$ and Q_4+ correlate about 0.5; $E+$ and $F+$ about .4; and $L+$ and $I+$ about .2. Consequently, we can factor analyze correlations among first-order factors and arrive at second-order factors, dimensions describing correlations among first-order factors. The causal interpretation of the loadings of a first-order on a second-order factor cannot be stated in a generalization applicable to all cases. Theoretically, second-orders can either be deeper causes or single consequences of the first-orders which load them, a point which we must consider in our subsequent interpretations.

Six second-order *L* and *Q* factors have been found in analysis of correlations between fourteen to sixteen first-orders. For adults, there has been one *L* data factoring (44, pp. 315 ff.) and seven major factorings of *Q* first-orders. The agreement of different researches is very good on replication tests of the existence of the first two second-orders, but increasingly uncertain on later ones. Our discussion will involve only the four best-confirmed second-orders and Table 4–3 gives the best mean estimate from all available researches, of the significant loadings of first-orders on these second-orders. It also gives interpretive titles for these factors, but fuller description of the factors is deferred until we relate them to clinically judged neuroticism.

Relation between scores on second-order questionnaire factors and clinically judged neuroticism. The profile of differences between neurotics and normals on first-order questionnaire factors (Table 4–2) can also be expressed in terms of second-order factors. The sten scores on first-orders are given weights approximating their loading on the second-orders, then combined in the proper direc-

TABLE 4–3

SECOND-ORDER RATING AND QUESTIONNAIRE FACTORS: AVERAGE* ESTIMATE FROM AVAILABLE RESEARCHES OF LOADINGS OF FIRST-ORDER QUESTIONNAIRE AND RATING FACTORS ON SECOND-ORDER FACTORS

First-Order Factor	Second-Order Factor I Introversion-Extraversion or Invia-Exvia			First-Order Factor	Second-Order Factor II Anxiety			First-Order Factor	Second-Order Factor III Pathemia (Affectivity) *vs.* Corticalertia			First-Order Factor	Second-Order Factor IV Promethean Will *vs.* Resignation		
	Adult Trait	Adult† State	Child‡ Trait		Adult Trait	Adult State	Child Trait		Adult Trait	Adult State	Child Trait		Adult Trait	Adult State	Child Trait
A–	–42	–38	–49	Q_4+	+67	+44	+44	I+	+44	+50	+19	N+	+32	+21	
F–	–40	–22	–44	O+	+60	+20	+50	N–	–37	–50		E+	+28	+52	+28
H–	–35	–12	–43	Q_3–	–53	–51	–33	A+	+28	+18	+60	Q_1+	+27	+12	
Q_2+	+32	+39	+06	C–	–49	–53	–40	Q_3–	–21	–04	–02	J–			–37
M+	+26	+36		L+	+45	+08		C–	–17	–08	–05	F+	+14	+17	+20
Q_1+	+19	+20		H–	–32	–06	–57	O+	+17	(–13)§	+07	Q_3–	–01	–07	–24
L+	+14	+12		M+	+30	+18						D+	+43		+09
				Q_2+		+30						C–	–15	(+02)	–01
				D+			+43								

*In combining loadings from separate studies to arrive at an average, equal weights were usually used, but these were sometimes modified slightly according to size of N in the study, goodness of measurement of the factor in that study, etc.

† The state is a pattern of change-through-time for a given individual or set of individuals, while the trait is a pattern referring to inter-individual differences at any given occasion of measurement.

‡ From 6 to 15 years of age

ion of loading to produce an estimate of the second-order factor score. Thus, the neurotic group's score on second-order factor II (see Table 4–3) is higher as this group deviates more from the 5.5 normal value, positively for Q_4 and O, and negatively for Q_3 and C. The estimated second-order sten scores for neurotics are again computed so that the 5.5 sten value represents the general normal population average, while a deviation from it of 1.0 or more stens is statistically significant. The sten values for the 201 neurotics on the four second-order dimensions thus become:

1. neurotics are very significantly higher than normals on F(Q)II, Anxiety (sten value = 7.6);
2. neurotics are significantly lower than normals on F(Q)IV, Promethean Will (sten value = 4.5);
3. neurotics are significantly or almost significantly higher than normals on F(Q)I, Introversion, and on F(Q)III, Emotional Immaturity or Pathemia, (sten value = 6.4 in both cases).

Interpretations of the above factors, available elsewhere in general terms (41, 44), are reviewed here with special emphasis on their relation to clinically judged neuroticism.

Anxiety, second-order factor II. Clinically judged neurotics are very significantly more anxious than normals as shown by the F(Q)II sten scores. The justification for interpreting F(Q)II as anxiety is given in the latter portion of this chapter, devoted to the anxiety concept.

Invia-Exvia, or Introversion-Extraversion, second-order factor I. Clinically judged neurotics tend to be more Introverted than normals, to a degree approaching statistical significance very closely. Both in questionnaires and ratings, F(Q)I is saturated with characteristics which psychologists have generally called extraversion *vs.* introversion. However, since the popular psychological writer is free to see the picture of extraversion *vs.* introversion as he will, it is desirable to use an unspoilt term, namely Invia *vs.* Exvia, for the determinate F(Q)I factor discovered here, which is potentially exactly measurable.

Pathemia vs. Corticalertia, second-order factor III. Clinically judged neurotics tend to be more Pathemic ("emotionally immature") at a level approaching statistical significance. Presumably this is because Pathemia (from the Greek root for "feeling") permits development of more irrational, purely emotional reactions to situations and events. All the first-orders loading this factor have the quality of intense emotional experience. This is not, apparently, general emotionality in the sense of impulsiveness associated with primary drives but rather a living and perceiving in more emotional terms, a characteristic one tends to find more among women than among men in our culture.

In fact, two of the main factors here, Warmth (A) and Sensitivity (I), are significantly higher for women than men. Another clue to the nature of this factor is that it correlates *negatively* with a factor in objective tests called Corticalertia, U.I. 22, characterized by speed and alertness in reactions typically at a cortical level. Also consistent with the above interpretive evidence is the fact that Pathemia decreases rapidly as a child matures (44, p. 617). Accordingly, the most promising hypothesis for Pathemia, F($\underset{\sim}{Q}$)III, is that it runs from a positive pole of predominance of hypothalamic, emotional perception and response to stimuli to an opposite pole of dry objectivity and rapid cortical relationship to cognitive realities.

Promethean Will vs. Resignation, second-order factor IV. Clinically judged neurotics have significantly more Religious Resignation than normals. This higher renunciation may be connected with a higher probability of demands for repressions (see pre-metric hypothesis, Chap. 2, p. 9 f.). As with the Oedipus complex, so here a character from Greek mythology seems best, temporarily at least, to hold the essence of the meaning observed. Individuals at the non-neurotic positive pole of this factor have been observed to be revolutionaries, cortical, egoistic, and of high perfectionistic drive, hence, the term "Promethean Will," after the aspiring, determined, irreverent character of Prometheus. One might think of such men as Robespierre and Lenin, or some aggressive or fanatical types in science. At the F($\underset{\sim}{Q}$)IV—, neurotic-associated pole, low Dominance (E—), lack of Shrewdness (N—), Conservatism (Q_1—), and somewhat greater regard for group moral values is something that suggests religious resignation, except that there is no specific cultural religious content in the general evidence. However, it is noteworthy that among occupations, priests are most conservative, $\underset{\sim}{Q}_1$—. (62, p. 27).

The above interpretations will be more fully developed later. But even now a very definite conclusion can be drawn, namely that *neither in terms of first-order or second-order factors do neurotics differ significantly from normals on only one central factor of neuroticism.* Thus, already, in our very first medium of observation, the questionnaire, we move toward that *multifactor theory of neurosis* which we shall develop increasingly as we proceed. This stands in contrast to the essentially unifactor-theory conclusions of Eysenck (86, 87) and of certain clinical theorists who have not, unfortunately, put their theories on the testable basis of exact factor statement as have Eysenck and his co-workers.

In summary, type definition (ability to discriminate between clinically judged neurotics and normals) confirms no less than eight first-order and two second-order, questionnaire-rating factors involved in eurosis. Each of these, therefore, deserves some identification with he clinical concept of neurosis. Apparently, all of them are in some vay essential to the development and/or expression of the neurotic erson, as clinically defined. Accordingly, type-defined factors of neuosis will be referred to, alternatively, as "neurotic-contributory" fac-

TABLE 4–4

Summary List of Type-defined Factors in Neurosis:
First- and Second-Order Questionnaire and Rating Factors Which
iscriminate Significantly Between Clinically Judged Neurotics and Normals

(Factor Titles Given in Neurotic Direction)

irst-Order *Q* and *L* Factors*		
.	Q_4+	High Level of Ergic Tension
.	O+	High Guilt Proneness
.	F−	Desurgency or Depression
.	I+	Premsia, Protected Emotional Sensitivity or Tender-Mindedness
.	C−	Low Ego Strength
.	L+	Much Suspiciousness or Protension
.	E−	Submissiveness, Dependence
.	H−	Threctia or Threat Vulnerability (*vs.* Parmia, Threat Invulnerability, or Venturesomeness)
econd-Order *Q* and *L* Factors		
.	F(Q)II+	Higher Level of Anxiety
.	F(Q)IV−	Resignation (*vs.* Promethean Will)
.	**F(Q)I+	Introversion (Invia)
.	**F(Q)III+	Pathemia or Emotional Immaturity

*First-orders 1 through 6 are also indicated as neurotic y trait definition since they seem also to involve eurotic-looking behaviors. The second-orders have been nterpreted so recently that, except for Anxiety, it was not hought worth while to apply the relatively loose trait defiition criterion to them.

*Approaches statistical significance, but does not quite chieve it.

tors. Table 4–4 lists the type-defined questionnaire and rating factors in neurosis, and records which of them also indicate neurosis by the secondary criterion of trait definition (involving characteristics that look neurotic).

Trait Definition of Anxiety in Terms of Questionnaire and Rating Factors

We now turn to the task of discovering which factor or factors can be identified with the concept of anxiety, a problem also discussed at length elsewhere (66). Already we have provisionally identified one of the neurotic-contributory factors as Anxiety, second-order F(Q)II (Table 4–3). In order to firm up the factorial identification of anxiety taken on faith in the last section, we need to consider more intensively the possible factor counterparts of the clinical concept of anxiety. As for trait definition, some "face valid" anxiety questionnaire factors (factors which have content most clinicians would call "anxiety") are: Ego Weakness (C—) involving inadequacies felt in meeting life's demands and despair of acting rationally; Threctia (H—) with its sheer timidity and shyness; Premsia (I+) with psychosomatic hypochondriacal manifestations; Guilt Proneness (O+) with its scrupulous worry and feelings of worthlessness; Desurgency (F—) with its qualities of agitated depression; and Ergic Tension (Q_4+) involving frustration and overwroughtness. Each of these seems to represent different qualities of felt anxiety as the clinician sees it, but no one of them seems to involve all the characteristics clinically attributed to anxiety. It therefore seems reasonable to look for anxiety's factor-counterpart in a second-order factor which involves all or most of the anxiety-like first-orders. Such a factor exists. Its average loadings appear under Factor II in Table 4–3, but since it is crucial in our consideration of anxiety, loadings for each individual study are given in Table 4–5. Clearly, the pattern was confirmed from study to study, even though the component studies involved different populations—college students, general population adults, maladjusted adults, children, etc. (see Appendix I). Thus the hypothesis of existence is confirmed in the sense that, whatever its nature, F(Q)II is a stable, replicable response pattern. As for interpretive hypothesis, the trait definition answer is that "anxiety" fits well for F(Q)II. Except for the absence of I+ and F—, and the easily understandable presence of L+ and M+, this is the only second-order factor which comprises all the clinically face valid first-order factors discussed above: Ego Weakness, Tension, Guilt Proneness, and Timidity.

The association of Protension or suspiciousness (L+) and Bohemian Non-Conformity (M+) with the putative anxiety factor will probably not surprise many clinicians. Our subsequent discussion of these factors brings out many characteristics of them which most clinicians would probably classify as anxiety indicants. I+, Protected Sensitivity or Tender-mindedness, and F—, Desurgent Depression,

First-Order *Q* and *L* Factors	Loadings in Individual Researches—High Anxiety Direction†												
	CR	CQ1	HSPQ1 CQ3	HSPQ2 CQ4	K	C5	ROS	R1	R2	D	G	CQ2	R3
	(Studies are described in Appendix I, designated as above.)												
Q_4+ More Ergic Tension		+.62	+.51	+.37	+.80	+.74	+.70	+.61	+.55	+.46	+.87	+.48	+.40
O + More Guilt Proneness		+.62	+.24	+.76	+.81	+.66	+.84	+.32	+.31	+.39	+.83	+.37	+.03
Q_3- Lack of Will Control		−.66	−.39	−.26	−.54	−.60			−.53	−.17	−.70	−.51	
C − Lack of Ego Strength	−.50	−.53	−.44	−.35	−.84	−.56	−.46	−.48	−.19	−.31	−.57	−.77	−.29
L + More Protension or Suspiciousness	+.47	+.54			+.65	+.54			+.14	+.20	+.65	+.08	
H − More Threctia, "shy"	−.20	−.46	−.66	−.47	−.33	−.33		−.36	−.20	−.19	−.40	−.16	(+.04)
M + More Autia or Non-Conformity		+.07			+.72	+.46	+.24	+.14	+.13	+.13	+.50	+.31	+.04
K− More Abcultion	−.54												
D + More Excitability			+.62	+.24									

*The average values given for this factor in Table 4-3 were a weighted combination of the above values. Here and in subsequent factor loading tables, a blank in the table means that the variable (first-order factor) was not present in a given study. If a variable was present in the study, its loadings are always given, whether or not they have the expected sign and degree of relationship. Brackets emphasize reversals in expected direction of sign. Direction of relationship to the anxiety factor is given by factor-title in the first column.

†The first four studies listed are based on correlations among first-order *factors*, while all other studies are based on correlations among item-based estimates of factors. CR is a rating data study; all others are questionnaire data. CQ3 and CQ4 used children, averaging about 13 years of age; all others normal adults, except K, which used abnormal adults. CQ2 and R3 were based on increments of response from one occasion of measurement to another, and hence reveal state or change-through-time factors; all other studies isolate Anxiety as a stable inter-individual difference trait. See Appendix I for further information on the contributory researches, including a study by Warburton on British students, received too recently for full consideration here, but providing an excellent fourteenth confirmation of the Anxiety questionnaire pattern.

classified by us as face valid anxiety factors, actually prove to be more organic to neurosis (see Table 4–4). The I+ dimension apparently expresses a general sensitive affectivity or excess of emotional expressiveness, in which anxiety has no more part than any other emotion. How easily can one be fooled by relying solely on manifest content, trait definition criteria.

Outside the broad realm of 16 P.F. questionnaire-factor measurement, F(Q)II has other rating and questionnaire associations which bear importantly on its interpretation as anxiety. All significant associations found appear in Table 4–6. There we see that F(Q)II is highly loaded by responses on a 90-item checklist covering the range of known clinically accepted symptoms of anxiety. This is direct trait-definition confirmation, since self-rating on the characteristics which clinicians call anxiety yields a test score which loads highly only on the F(Q)II factor. Table 4–6 also shows some of the traditional anxiety measures to which F(Q)II is related; for example, the Taylor Scale, certain Rorschach measures, etc.[7] A final trait definition confirmation of F(Q)II as anxiety is that it proves to be virtually identical to a first-order objective test factor, which, more than any other such factor, reveals intrinsic anxiety content such as guilt, inferiority feelings, high sex drive, irritability, isolation, etc. However, discussion of this factor belongs properly to the next chapter.

Type Definition of Anxiety in Terms of Questionnaire and Rating Factors

More than any other *Q* or *L* data factor, second-order factor II meets trait definition criteria for identification with the clinical concept of anxiety. That is, F(Q)II preëminently involves characteristics which clinicians agree indicate anxiety. Does F(Q)II also qualify as anxiety on type definition grounds, that is, do scores on it significantly discriminate between persons with higher and lower levels of anxiety, as clinically evaluated?

Table 4–6 presents the essential data on this point, in terms of correlations[8] between psychiatric evaluations of anxiety and F(Q)II.

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[7] Assuming, for the moment, what we believe is amply demonstrated in the remainder of this chapter—that F(Q)II is the anxiety dimension—it should then be noted that not every test alleged to measure anxiety actually associates with F(Q)II. Hundreds of tests have been tried against F(Q)II and found not to associate with it in spite of the fact that many of these non-marker tests look like they might involve anxiety. The complete list of anxiety factor *non-markers* (not associated) as of 1958 has been deposited as Document #5336, American Documentation Institute, Auxiliary Publications Project, Photoduplication Service, Library of Congress, Washington 25, D.C.

[8] A *loading* of a variable on a factor is essentially equivalent to its correlation with that factor.

OTHER RATING AND QUESTIONNAIRE ASSOCIATIONS OF THE ANXIETY FACTOR (F(Q)II)

Variable	Researches								
	R1	R2	R3	R4	R5	MR**	D	MC	ROS
	(Studies are described in Appendix I, as designated above)								
Anxiety-Tension Self-Checklist	+.56	+.55	+.41	+.47	+.44	+.05			
Taylor Scale								+.82	+.85
Clinical Evaluation—Global Anxiety, Psychiatrist I	+.30								
Clinical Evaluation—Global Anxiety, Psychiatrist II	+.36								
Clinical Evaluation of Anxiety, Psychiatrist Team III						+.20			
"Free" Anxiety, Psychiatrist I	+.42								
"Situational" Anxiety, Psychiatrist I	+.26								
Rorschach m-inanimate movement							+.44		
Rorschach FM-animal movement							+.39		
Rorschach FK Chiaroscuro							−.23		
Rorschach -Fc							−.22		
Rorschach C							+.22		
Rorschach P							−.24		
Rorschach k, K							−.22		
Rorschach D							+.16		
Rorschach -F+%*							+.16		

*Rorschach -F+% also loaded .26 in a small (N = 10) study at Michael Reese Hospital and Rorschach M:Sum c loaded −.44. It is not known if the latter is similar to Davies (79) M: Sum c which loaded −.11. Rorschach M loaded negligibly both here and in the Davies study.

**The MR study did not appear in Table 4-5 with individual first-order loadings on F(Q)II, because only a total questionnaire-factor score was used in this study (combined, weighted scores of Q_4+, C−, Q_3−, O+, L+, H−, and M+).

A positive correlation between psychiatric evaluations of anxiety and F(Q)II means that people with higher anxiety levels as psychiatrically evaluated also tend to have higher scores on F(Q)II. A significant correlation coefficient of this type is only a logically equivalent way of stating the fact that a clinically evaluated high anxiety group (type) would have significantly higher scores on F(Q)II than would a clinically evaluated low anxiety group. Thus, the Table 4–6 correlational data are interpretable in terms of type definition of anxiety, just as were the sten data on neurotics *vs.* normals in Table 4–2. Our type definition of anxiety also parallels type definition of neurosis in not resting the case on the possible idiosyncrasies of one clinician or sample. Psychiatrist I and II (Table 4–6) worked independently of one another on the same subjects in the R1 study (192), while the team of psychiatrists making evaluation number III worked independently of I and II, and on a different sample of persons.

The anxiety type definition data on F(Q)II may be summarized as follows:

1. Table 4–6 shows that in all three cases where F(Q)II was checked against clinical evaluations of anxiety it associated with them at a statistically significant value of .20 or more.
2. As will be shown by later discussion, *clinical evaluations of anxiety always loaded F(Q)II more highly than they did any other factors.*
3. In the R1 study, F(Q)II was the only one of fifteen personality-sphere-covering factors in which *both* of two independently working psychiatrists agreed in loading (64, 192).
4. Finally, in the MR study (Appendix I), psychiatric evaluations of anger and depression level did not load F(Q)II significantly, while psychiatrically evaluated anxiety level did.

To rephrase the above results more explicitly in terms of our type definition orientation: F(Q)II is the only known *Q* and *L* factor which significantly and consistently (through different clinicians and persons evaluated) discriminates between higher and lower anxiety persons, as clinically evaluated. We conclude that, on both type and trait definition grounds, F(Q)II is the only or, at least, the major factor to which the clinical concept of anxiety pertains.

Now that F(Q)II is identified with the clinical concept of anxiety, we can give definite answers to two important questions we have posed about it (see Chap. 2). In regard to the first question—the relation of anxiety to neurosis—our direct empirical evidence shows that anxiety is involved in but not coextensive with neuroticism, for while F(Q)II is the only factor which significantly discriminates between high and low anxiety types, F(Q)II *plus* other factors are necessary to discriminate maximally between clinically judged neurotics and normals.

FACTOR-COMPONENTS IN ANXIETY. The second question is: Is anxiety an empirically unitary concept, i.e., is there one anxiety or are there several anxieties? Table 4–5 shows at least five important and distinct first-order factors in anxiety, but, (a) on trait definition grounds, no one of them involves a preëminent proportion of the characteristics which clinicians agree in ascribing to anxiety, and (b) analysis of the correlations between these first-orders shows that they group in a single second-order dimension which does meet both type and trait definition criteria. Thus, at present, the best conclusion seems to be that anxiety is a unitary concept attachable to a broad second-order questionnaire-factor with, however, distinct first-order components whose separate contributions it is important to understand. Let us therefore consider the anxiety-component primaries in approximate order of their loading importance on the second-order anxiety factor (Table 4–5).

High Ergic Tension, Q_4+. This has been defined by content and by criterion association (44, p. 218) as stimulated but undischarged energy arising from any erg (drive). Its demonstrated powerful role in F(Q)II anxiety, strongly confirms pre-metric hypothesis no. 1, p. 18, generalizing the psychoanalytic libidinal and transfer explanation to all ergic tension. However, the related pre-metric hypotheses that this transformation into anxiety occurs (a) through the primary fear of overthrow existing in the ego, and (b) through reactivation or recollection of punishment for ergic expression, remain to be tested by evidence additional to the present, which merely establishes a substantial proportionality of one to the other, without evidence of the intervening causal mechanism.

High Guilt Proneness, $O+$. This is overtly reported as a form of anxiety with guilt and unworthiness prominent, and it correlates with "approved" and considerate behavior as observed by colleagues. But it is unsettled whether this factor is an acquired superego structure, additional to the G pattern (44, p. 122) of external expressed and habitualized superego, or a more temperamental tenderheartedness and submissiveness (44, p. 207). If further evidence points to the superego interpretation, its substantial loading here would fit that part of the psychoanalytic views accepted in the pre-metric hypothesis that, other things being equal, more powerful superego means more generation of anxiety (No. 3, p. 19).

Lack of Will Control, or Low Self-Sentiment Strength, Q_3-. This factor is interpreted as control of impulse and excitability by the self-sentiment (44, p. 213). There is also evidence of a quite substantial hereditary determination which may suggest either that we are dealing with a more temperamental dimension than the sentiment hypothesized would require, or that some temperamental capacity to integrate is an appreciable determiner of the development of a stable self-sentiment around a clear self concept. Lack of integration of impulses by will control in relation to a clearly stabilized self concept would raise the whole level of internal conflict (quite apart from major conflict such as superego and id) and therefore of anxiety. But, alternatively, it is as logically permissible to hypothesize that high anxiety is in some way unfavorable to the development of a strong, integrated self-sentiment.

Lack of Ego Strength, C—. This factor, as it has previously been interpreted, fits excellently the pre-metric hypothesis that ego weakness is a systematic cause of anxiety (No. 2, p. 19). But the correlation could equally fit a theory that a high level of anxiety produces ego weakness, either as a temporary state or as an historical consequence of anxiety throughout personal development.

More Protension or Suspiciousness, L+. Initially, this was an unexpected component, both from the standpoint of our pre-metric theory and also because neither the behavior nor the questionnaire items seem at first to have the manifest content which would warrant the designation "anxiety." An effect in either direction is possible: (a) anxiety operating as a pattern of insecurity over a long period, induces the paranoid suspicion, jealousy, protection defenses, and the poor judgment and biased perfection in the whole paranoid-type defense system, or (b) the social isolation produced by the paranoid behavior creates increasing insecurity and anxiety.

More Threctia, H—. The evidence is now substantial that Parmia *vs.* Threctia is one of the most highly constitutionally determined dimensions (52). As to interpretation, evidence is that it operates at the positive pole as venturesomeness or parasympathetic resistance to sympathetic action (abbreviated to Parmia, H+), as opposed to autonomic threat reactivity or timidity (abbreviated to Threctia, H—) at the negative pole (44, p. 192). Its demonstrated role in anxiety agrees with the Chapter 2 pre-metric hypothesis that the natural timidity of the individual should be more reckoned with, clinically, to account for either a high situational or characterological anxiety level (p. 20), Chap. 2). In this case, the causation seems most likely to be in the direction of Threctia contributing to the pool of anxiety.

More Autia or Non-Conformity, M+. This factor has a slight but consistent relationship to F(Q)II anxiety suggesting either that, one, the non-conforming, impractical, Bohemian characteristics of M+ place the person in an isolated, separated and vulnerable position, with anxiety arising as a consequence, and/or, two, the pressures and frictions of anxiety in day-to-day group living occur first, to be followed by the moving-away from the group and the actual dissociative tendencies which appear in the content of M+.

In summary, type definition of questionnaire anxiety (as contrasted with a priori analysis of face validity) reveals a high libido-type level of undischarged general drive tension (Q_4+), which is not integrated properly in relation to a clearly stabilized self-concept (Q_3—). Further, there is a poorly developed, weak ego (C—), with the powerful superego development suggested by the guilt proneness and feelings of unworthiness of O+. Less central, but still important are the paranoid-like suspicion of L+, the timidity and high threat susceptibility of H—, and the non-conforming, isolated, dissociative tendencies of M+. No comment is made here on factors D, Excitability, and K—, Abcultion, (see Table 4–5), because they are assessed in adults only by ratings, not by the 16 P.F. questionnaire measures, and are therefore not replicated by several researches. However, D is replicated once as a questionnaire measurement in children, and both of these factors will be discussed again in later chapters.

Summary

Neurosis and anxiety are defined in terms of questionnaire and rating factor-dimensions.

1. It is found that the concept-label neurosis cannot be affixed to any single *Q* or *L* factor; hence our multifactor theory of the nature of neurosis. At least eight first-order and two second-order factors significantly discriminate between clinically judged neurotics and normals (type definition), and many of these also involve characteristics which clinicians would call neurotic (trait definition). Table 4–4 lists these neurotic-contributory factors, and they are briefly interpreted in the chapter.

2. In contrast to neurosis, both trait and type definition attach the clinical concept of anxiety to a single second-order factor, F(Q)II. The main first-order *Q* and *L* components in this factor are Ergic Tension, Q_4+; Ego Weakness, C—; Guilt Proneness, O+; Low Self-Sentiment Strength, Q_3—; and Protension or Suspiciousness, L+. Brief interpretations of these are given in relation to anxiety. F(Q)II, Anxiety, is only one of the neurotic-contributory factors, hence, we conclude that anxiety is part but not all of neurosis, which is a broader and more complex concept.

CHAPTER 5

TYPE AND TRAIT DEFINITION OF NEUROTICISM AND ANXIETY: OBJECTIVE TEST DATA

Nature of Objective Tests, as Contrasted with Ratings and Questionnaires

Having experimentally established type and trait definitions of anxiety and neuroticism in terms of questionnaire and rating factors, we will now repeat the process in terms of objective test factors. The nature of the objective test medium (*T* data) will be discussed at some length here, since it is not so well understood as the traditional *Q* and *L* types of measurement. Fuller, systematic discussions have recently become available elsewhere, for those who wish to pursue the topic further (48, 189).

Like questionnaires, objective tests are scored by key or other standard scoring system so that, within limits of clerical error, all observers will agree on the score to be assigned a given performance. Unlike questionnaires, objective tests tend to measure what the subject actually does, rather than what he says about what he does. Finally, as an ideal which is being ever more closely approached, objective tests attempt to disguise the purpose of the test (thus, "good" performance in a gestalt closure test can be interpreted as an indicant of psychoticism), and reduce the degree to which a person can control his responses deliberately in order to fake (e.g., systolic pulse pressure as a personality measure). *Q* data attains objectivity only in regard to score, and this is best called *conspect reliability* (44, p. 342; 48); but when we speak of objectivity in the full sense of *T* data, we mean a test involving a behavioral response which reveals personality information in a way which is not clear to the subject.

This objectivity would in itself justify consideration of *T* data experimental evidence separately from that which comes through the biases of verbal concepts in ratings, or the lack of true or honest self-evaluation in the "mental interiors" of factors as seen in questionnaires. But there is, unfortunately, an additional reason for so doing. Most investigators of personality structure by correlational methods had hoped that the same structures would be revealed running across all three media of expression. This has so far proved substantially true of only *L* and *Q* media. In them, the same factor is seen first as a pattern of rated everyday life behavior, and secondly, a trifle changed in sense, as a questionnaire mental interior.

The absence of a simple one-to-one relation between *L* and *Q* data patterns on the one hand, and objective test data patterns on the other, may be due to (a) the relatively greater degree to which questionnaire evaluations can be distorted and faked (suggesting that objective test assessment will ultimately prove to be the more penetrating), and/or (b) a difference in density of representation of variables in correlational studies in these media. Presumably, in the area of personality, our culture has provided in language a means of making very fine distinctions, and we can thus define many *Q* and *L* variables in a comparatively small area of behavior. This is not so with objective tests. There are very few different forms of behavioral tests which psychologists can experimentally design to measure essentially the same trait. Hence, objective test measurements cover broader areas of personality than do questionnaire measurements, and, as one would expect on this hypothesis, second-order factors in questionnaires usually turn out to be first-order objective test factors.

Thus far we have spoken of objective tests and questionnaire measurement mainly as different ways of getting at the same basic phenomena, with perhaps objective tests ultimately to be preferred as more immune to motivational distortion. However, because of the psychologist's greater ease in seeing what questionnaire factors mean clinically, the order of preference has until recently been quite the reverse, assigning priority to questionnaire or rating data as the criteria. (In this sense, factoring *Q* and *T* data simultaneously is factoring the criterion and the test together.) There is some reason in this approach, and our own attainment of many *T* data factor patterns has in fact resulted from attempting to find or create experimental situations, the scores on which will correlate with factors already recognized as hypotheses in *L* and *Q* data.

But this is not quite the whole story. Repeatedly, quite unexpected factors, apparently unrelated to known *L* or *Q* measurements, have been found among collections of objective personality tests put together for one purpose or another. Such factors often cannot be confidently interpreted at present, for with new experimental behaviors, as contrasted with old and familiar ratings or questions about everyday behavior, it is comparatively difficult to define what can be common to the response measures found in the factor. This is another reason why it is necessary to consider factors in objective test measures of neuroticism and anxiety as if they belonged in a different world—until further work discovers their external criterion associations or indicates that they are different expressions of familiar L and Q factors. Thus, the media are kept apart until relations are finalized by additional research.

So far we have defined objective tests generally as tests which are key-scored but disguised from the subject in regard to what is being interpreted, thus preventing the subject from controlling his response with a view to deliberate or self-deceptive distortion. More specifically, the tests which we have classed as objective include such sub-categories as (a) misperceptive (projective) tests, (b) physiological measures, (c) many tests that look like achievement tests, such as gestalt closure, (d) stylistic tests, (e) performance tests, and (f) other tests involving verbal material in a disguised manner, for example, a test of expressed confidence in untried skills. Many of these tests were specifically designed by us to load on a given personality factor-dimension and/or to test hypotheses as to intrinsic differences between personality dimensions; but many others were selected from the literature of general experimental psychology to interlock our findings with univariate research studies. Many of the misperception tests, for example, were borrowed from work with personality dynamics. The objective tests that are physiological or largely physiological include such measurements as G.S.R. response, tremor, acidity of saliva, and blood pressure. Over a twenty-year period, some seven hundred objective tests have been used in our own and other factor analytic studies of general personality structure. These are listed in this laboratory's *Encyclopedia of Objective Tests*, being prepared for publication. The tests are immensely varied in type and conception, including individual and group administration, dynamic and general modalities of personality, etc. No attempt will be made to describe them in detail here since many of the descriptions are now available elsewhere (29, 40, 44, 68, 73) and all will be systematically covered in a book now in preparation (see Appendix I, p. 469).

Personality Structure and Dimensionality in Objective Test Data: The O-A Test Factor System

A main tenet of the present experimental design has been to see clinical phenomena against a setting of the total normal personality structure and to check the broadest possible range of measurements in relation to clinical phenomena. Consequently, in the realm of objective tests, we must pause to look at evidence about general personality structure, just as was done for L and Q data. This rather far-ranging evidence has been systematically set out and discussed elsewhere (39, 44), so only the barest resumé is necessary here.

Factor analysis of the wide range of behavior caught in objective tests yields between eighteen and twenty distinct, replicable factor-dimensions. These dimensions have initially been numbered, to avoid premature interpretive labels, in a universal index system, as U.I. 16 through U.I. 36 (see Chap. 3). They each apparently have the same breadth, status, and order as the Spearman-Thurstone general ability factor, for this commonly appears among them as U.I. 1. Also, some of the dimensions can be interpreted and recognized as clinically known dimensions, such as extraversion. These factors, as noted before, are based on a very extensive sampling of possible objective tests; hence, we believe the resulting eighteen to twenty dimensions cover the total personality dimensionality more completely than any other system extant. However, we cannot be sure how absolutely comprehensive of behavior this coverage is, for it is just as true of factor analysis as of traditional experiment that you can only get out what you put in. For example, no concept of a personality factor covering the relation of speed of perception to rate of conditioning can emerge unless these measures enter the factor analysis, just as in univariate design nothing could be concluded about relations of things that are not measured.[1] Indeed, there is a constant danger, upon finding that variable X does not load a certain reported factor, of forgetting that variable X may never have entered into the experiment at all. Our tabular surveys of general personality structure (38, 39, 44) have always carefully indicated whether a variable was present but failed to load or was entirely absent from the experiment.

All that can be said in favor of the view that the twenty or so *T* dimensions are reasonably exhaustive of the factors necessary to describe individual differences in personality, is that they arise from a very large number of tested variables applied to up to ten varied population samples. Between 1930 and 1955, some three hundred diverse test situations were designed in this laboratory alone, and a sampling of those designed elsewhere, including those by Eysenck and his co-workers, were added to the pool as research proceeded. Since 1955, in the work more specifically directed to clinically relevant factors, the total number of behavioral situations and scores under experimental study has risen to nearly seven hundred. These tests have been enriched in meaning by being related to thousands of questionnaire items covering the personality sphere in questionnaire form and to an ample supply of rating measurements. To clinicians familiar in routine work with only two or three tests, such as the Rorschach inkblots, the T.A.T., aspiration level measures, etc., it is difficult to convey in a few words the abundance of behavioral facets that can be caught in these newer batteries. In the twenty-five to thirty publications in which results with these tests are analyzed, each objective test variable is referred to by a Master Index (M.I.) number, which has been retained constant for identification from study to study.

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[1] However, for those unfamiliar with multivariate experimental design, it should be pointed out that, providing the stuff of certain factors is present, the addition or subtraction of variables constituting parts thereof will not influence the number and nature of factors found. For example, the addition of a particular cluster of highly intercorrelating variables will not pull the factor over toward the cluster. The position of a factor is decided by a hyperplane in k-1 space, where there are k factors. A single bunch of variables can do little or nothing to upset the unique determination of a pattern extending through k-1 space.

A grasp of this whole research movement and its findings will be ensured if the clinician bears in mind that, in an important sense, our approach is just the opposite of that embodied in research on the Rorschach and similar tests. There, the test is taken as the center of attention, and attempts are made to extract predictions of many aspects of personality from this single testing procedure. In contrast to this *test-centered* approach, the *factor-centered* approach first finds broad patterns of proven functional unity (empirical groupings and cleavages among tests) in response to a wide array of test behavior. These concepts, which are of general negotiability in psychological theory, then become the focus of thought for the construction, according to explicit principles, of objective tests and experimental situations that might be expected to be purer measures of the factors.

The actual test procedures with which we end up for testing a factor —the tests which have delivered the goods—are only, as it were, the visible part of an iceberg, in relation to a submerged mass of test-invention and trial. It is one thing to set up some single test ritual and then weave extensive theories about more or less ill-defined or even imaginary traits that are believed to be revealed by it. But it is a very different task to demonstrate broad patterns of personality response, found among myriads of tests, which are systematically replicated as patterns in many factor analytic studies. Years of further research may be necessary to clarify these multivariate-pattern-based concepts to the point where, from basic principles, tests can be confidently constructed which will have very high loadings on these factors.

The greater psychological, technical, and statistical complexity of experiment required to yield findings in these latter, more theoretically potent terms may account for the fact that fifteen to twenty years of such research have not reached far beyond demonstration of the factors per se, for greater resources at this point of growth in personality study would have been required also to press research into practical test routines in clinics that might by now have yielded all the criterion associations needed for factor interpretations. But this new stage of criterion validation and fuller interpretation is essentially what we have launched in this book. Though we are short of adequate interpretation of several factors which relate to the present clinical problem, the factors are real enough (hypothesis of existence) and measurable with known validity, and we stand on the brink of interpretation full of insight which will enrich the clinical application through which it occurs.

Distinction of the Neurotic Type in Terms of Objective Test First-Order Factors

Since objective tests tend to be disguised in purpose, most objective test behaviors are not immediately meaningful clinically. Hence, we will omit any systematic attempt at trait definition of neurosis (in terms of calling a factor neurotic because it involves behavior which clinicians term neurotic). However, once a type-defined factor of neurosis is established, by showing that people typed as neurotic have more of it, we shall scan it for behaviors which look neurotic.

A type-defined neurotic or neurotic-contributory factor is defined as one whose scores significantly discriminate between the clinically judged neurotic person and the normal; hence, the studies to be described are designed to compare the factor scores of neurotics and normals. Our basic methodological orientation required that we enter the experiment with the broadest possible measurement coverage. This comprehensiveness is needed for various reasons. (i) We cannot presume a priori from our present knowledge that only one or even a restricted sub-set of objective test factors will discriminate. In fact, pre-metric theorizing (Chap. 2) and questionnaire-rating evidence (Chap. 4) positively indicate that neurosis should show a complexity of personality derivation. (ii) We wish to cover normal as well as abnormal manifestations. (iii) We do not wish to leave logical loopholes, such as, X measurement might have discriminated between neurotics and normals if it had been tried. Accordingly, we entered with very broad coverage of objective test dimensions, some twenty in all, most of them repeated two or three times in separate experiments (see Table 5–1). On the average, each factor was measured by six diverse sub-tests and the two most comprehensive studies required some six hours of testing.

Table 5–1 summarizes our data on objective test discrimination between neurotics and normals. The first four studies to the left constitute the most direct evidence, and are listed from left to right in order of adequacy (size of sample, degree of agreement on neuroticism in neurotic sample, matching of neurotics and normals, goodness of factor measurement and coverage). Supplementary information on the six studies is available in Appendix I, while the essentials necessary for understanding Table 5–1 are given below.

R9-Ta. What we consider our main and most typical group of neurotics is in this study. This group, all but five of which were from Canada,[2] consisted of twenty-four adult neurotics seeking clinical help, with good agreement clinically as to the presence of neurosis. These were matched with 30 normals as follows: neurotics included 15 females and 9 males; normals included 13 females and 17 males; average age was 30.5 for neurotics, 27.1 for normals. The neurotics' average educational level was 10.4 years of school, as compared with 12.6 for the normals. All fifty-four subjects were tested on the full 18 factor Objective-Analytic battery, as published in 1955 (73).

R10. This study operates on a group of twenty-five cases from Kankakee State Hospital, Illinois, reasonably well-matched with 32 normal controls (see Appendix I). The State Hospital provided us with the closest to true neurotics in residence, but these actually turned out to be alcoholics, drug addicts, and less symptomatically definable cases, a proportion in which the symptoms primarily expressed a neurotic condition of the "acting out" character or behavior neurosis type. Technically, these can be classified as "sociopaths" with definite neurotic trends, for they were selected from the sociopathic group as showing the most neurotic structure. Although there is no large category corresponding to the term, we shall call them neurotics with sociopathic trends. In Chapter 7 (p. 130), we shall discuss evidence which indicates that the R10 sample is indeed closely related to typical neurotics, at least as far as their psychometrically-measurable questionnaire characteristics are concerned. There, this very same sociopathic group (together with three other sociopaths) proves to have a questionnaire-factor profile which is as closely related to several sets of classical neurotic-syndrome profiles as these are related to each other. The fifty-seven subjects in the R10 experiment were tested on a recently improved version of the 1955 O-A battery for measuring objective test factors.

R9-Tb. This was a small supporting study conducted by the authors and Dr. Clifford Swensen, Associate Professor of Psychology at the University of Tennessee, Knoxville, Tenn. The sample was small (five neurotics, 19 normals) and the number of tests per factor was curtailed to reduce testing time to two and one-half hours per subject. The neurotics included three males and two females averaging 31.2 years of age; the normals included 10 males and 9 females, averaging 25.7 years of age. The greatest discrepancy in matching comes in educational level, with the neurotics much higher (14.4 years of school) than the normals

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[2] Most of the R9-Ta data were provided through the courtesy of Dr. H. C. Hutchison and Mr. Owen White, Department of Psychiatry, University of Toronto, Toronto, Ont., Canada, working under Canadian Federal-Provincial Mental Health Grant #605-5-243.

(10.8 years). This contrasts with the R9-Ta and R10 studies, where the normals were slightly better educated, and the R6 study (discussed below), where normals and neurotics were perfectly matched on educational level. In view of the above, R9-Tb will help to bring out those neurotic-type characteristics which are not modified by or otherwise related to educational advantages, for this is a logical interpretation of consistency in direction of relation of the neurotic-normal dichotomy to a factor, in spite of reversals between studies in the direction of educational advantage. On the whole, however, the small sample size in R9-Tb will not permit us to weight it heavily in analysis of results.

R6. This recent study compared 49 normals and 49 neurotics on an estimate of the U.I. 23 factor, very adequately based on ten of its highest-loading tests. The 49 neurotics were exactly matched with the 49 normals in age, educational level, and proportion of males and females. This study is reported on fully in a separate publication (193) and is further described in Appendix I.

To the results of these four directly relevant experiments there is added in Table 5–1, first (R9-Q), a statement whether the independent results with the second-order questionnaire factors known to match the objective test primary factors, agree with those for objective tests, and, secondly (AF-Sells), a statement of the correlations obtained between these factors and a clinical rating of maladjustment and performance in a group of 225 normal Air Force cadets and officers (AF study in Appendix I). This last result cannot be lined up directly with the four columns of clinical findings because (i) it deals with correlations, not t-ratio difference, (ii) all subjects were normals and counter-selected for neuroticism, that is, unusually healthy, and (iii) the criterion is a mixture of success in aviation school and psychiatrically evaluated freedom from liability to neurotic breakdown. The second part of this criterion is, however, conceptually on the same dimension as neuroticism, and the results on so excellent a sample and thorough an examination seemed worth including, as a perspective-giving comment on the other values.

The factors are arranged in this table in descending order of magnitude of association with neuroticism, according to a weighted function of the evidence from the different samples, greatest weight being given to R9-Ta, because of the high typicality of neurotics therein, and second weight to R10, where the neurotics included more acting out and dope-addict cases of less certain diagnosis, but where the testing was still on a very extensive battery and the sample size was appreciable.

Demanding a $P = .01$ significance on both the large groups (discounting R9-Tb with only 5 neurotics), no fewer than five factors consistently distinguish neurotics from normals. At least two more factors

TABLE 5-1

SUMMARY OF DATA RELATING FIRST-ORDER OBJECTIVE-TEST FACTORS TO CLINICALLY JUDGED NEUROTICISM VS. NORMALCY

(Factor Titles in Positive Direction, t-Ratio Signs Given in Neurotic-Group Direction)

Note: The accompanying text and Appendix I give further information on the contributory studies.

Factor Title (Positive Pole) and Universal Index Number		*R9-Ta (Toronto) 30 Normals 24 Neurotics N = 54*	*R10 (Illinois) 32 Normals 25 Neurotics N = 57*	*R9-Tb (Tennessee) 19 Normals 5 Neurotics N = 24*	*R6 (Illinois) 49 Normals 49 Neurotics N = 98*
Corticalertia or Emotional Maturity	U.I. 22	−2.62*	−8.33†	−3.31*	
Responsive Will	U.I. 29	−5.62†	−7.95†	.33	
Competent Assertiveness or Harria	U.I. 16	−4.47†	−8.73†	.52	
High Mobilization	U.I. 23	−3.60†	−5.73†	.45	−2.85*
Intelligence	U.I. 1	−4.12†	−3.67†	X	
Promethean Will	U.I. 19	−3.87†	−1.04	−1.27	
Exuberance	U.I. 21	−4.53†	−3.68†	1.20	
Anxiety	U.I. 24	2.01*	1.34	.15	
Invia or Introversion	U.I. 32	2.10*	3.94†	− .42	
Careful Realism	U.I. 25	− .54	−2.17*	.22	
Autia or Non-Conformity	U.I. 34	X	5.75†	X	
Rigid Superego	U.I. 28	3.06*	−4.03†	− .55	
Inhibition	U.I. 17	1.82	−3.24†	.14	
Shrewdness	U.I. 18	.92	− .45	.66	
Comention	U.I. 20	1.07	.23	− .42	
Narcistic Self-Will	U.I. 26	−2.68*	.27	1.77	
Apathy-Fatigue	U.I. 27	− .88	−.43	.58	
Stolid Independence	U.I. 30	− .83	2.54*	X	
Wary Realism	U.I. 31	− .55	− .10	X	
Dourness	U.I. 33	− .21	.20	X	

*Significant at .05 level or more (Two-tailed test).
†Significant at .001 level or more (Two-tailed test).

	R9-Q (Indirect) (U.S. and Britain) 16 P.F. Normal Standardization Sample and 201 Neurotics, confirming or contradictory indirect evidence from questionnaire factors known to be associated or partially associated with objective test factors.	*AF-Sells (Indirect) N = 225 Air Force Cadets and Officers. Biserial r's with school pass vs. failure criterion, including psychiatric maladjustment elements. Direction of relation parallels t's to left.*
Corticalertia or Emotional Maturity	U.I. 22− ::: F(Q)III+, which confirms‡	−.23
Responsive Will	No *Q* Associates	−.02
Competent Assertiveness or Harria	U.I. 16+ ::: I+, which confirms	−.08
High Mobilization	No *Q* Associates	X
Intelligence	U.I. 1− = B−, which confirms	−.24
Promethean Will	U.I. 19− ::: F(Q)IV−, which confirms	−.23
Exuberance	U.I. 21− ::: F−, which confirms	−.07
Anxiety	U.I. 24+ = F(Q)II+, which confirms	−.03
Invia or Introversion	U.I. 32+ = F(Q)I+, which confirms	−.15
Careful Realism	No *Q* Associates	−.20
Autia or Non-Conformity	U.I. 34+ ::: M+, which confirms	X
Rigid Superego	No *Q* Associates	X
Inhibition	U.I. 17+ ::: H−, F−, Q_3+, which relate differently	.05
Shrewdness	U.I. 18+ ::: N+, which is not significantly related	−.04
Comention	No *Q* Associates	−.29
Narcistic Self-Will	No Clear *Q* Associates	00
Apathy-Fatigue	No *Q* Associates	X
Stolid Independence	No *Q* Associates	−.08
Wary Realism	No *Q* Associates	X
Dourness	No *Q* Associates	00

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‡ The sign ::: means that there is some relation between the *Q* and *T* factor, but not a perfect one. The sign = means that the relation is quite well established and approaches being one-to-one.

do so at the $P = .05$ level. It is quite evident that our thinking must be in terms of a *multifactor theory of neurosis,* rather than in terms of a single neuroticism factor as proposed by Eysenck (86, 87) and others. As it happens, all of the factors involved are among those well replicated in our general research on personality structure. That is to say, no doubts arise as to the hypotheses of existence of the patterns in these cases, though, as the following discussion will show, we may sometimes have difficulty at this stage in confirming a particular hypothesis of interpretation.

In this chapter, we shall stop at a relatively descriptive statement of these factors and leave the fuller interpretation of their relation to neurosis to the theoretical development in Chapters 12 and 13. Also, in Table 5–1, we shall draw a relatively arbitrary line between the factors most significantly and meaningfully involved in neurosis, which we shall call *neurotic process* factors, and those still associated (down to about the $P = .05$ level) but less systematically, which come into a broader concept of *neurotic-contributory* factors. For the sake of ease of cross reference, however, the description of the important individual factors which now follows will be in order of their Universal Index numbers (45).

Description of the Important Neurotic-Contributory T Data Dimensions of Personality

U.I. 1. GENERAL INTELLIGENCE. The significant association between neuroticism and low intelligence ($P = .001$, Table 5–1) may be speciously high here due to selection effects in the sample. In the R9-$\underset{\sim}{Q}$ study (Chap. 4) with 201 neurotics and a very large sample of prematched normals, low intelligence was also associated with neuroticism as type-defined, but much less strongly. One must, indeed, conclude from this and other experiments that the neuroticism-intelligence relation is quite sensitive to selection effects difficult to control and is not necessarily a strong relation. However, the general theoretical position can be taken that low intelligence leads to an accumulation of unsolved drive satisfaction problems. This and other complex interpretive issues on this point will be deferred until later chapters.

U.I. 16. HARRIC ASSERTIVENESS VS. PREMSIA.[3] At the U.I. 16(+) non-neurotic pole, the responses in this pattern show tough insensitivity, assertiveness, realism, decisiveness, high speed, sure taste, and apparently a desire to achieve and be up-to-date socially (44, p. 235). U.I. 16+ is related to questionnaire factor I−, or Harria *vs.* Premsia, which, like U.I. 16, correlates negatively with neuroticism (p. 44). Assuming the interpretation of Premsia at the I+ or U.I. 16− neurotic pole, we have there a dependent, oversensitive personality making little attempt at aggressive handling of the environment. The theory of Harria *vs.* Premsia is that it is produced by an over-protective environment. The positive (opposite) Harria pole represents a personality of high self-reliance and self-assertion, produced in a nonchalant family atmosphere. The term "Harria" or "Harric Assertiveness" is meant to convey that this is not the whole achievement motive but only one special part of it. U.I. 16's interesting positive association with large body size ($r = .30$) also suggests influences in childhood leading to less protection and more responsibility operating (at the positive pole) toward enterprise and independence, while its rise throughout a childhood age graph also ties it to independence and self-determination. In brief, U.I. 16+ is realistic assertiveness and independence and is negatively associated with neuroticism ($P = .01$, Table 5–1) possibly because this independence favors ego development (see pre-metric hypotheses, pp. 8 f.).

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[3] *"Premsia"* is a condensation of "protected, emotional sensitivity," because all evidence points to its being an environmental source trait produced by a social atmosphere of overprotection, stability, and even indulgence. The names of all primary personality source traits are designed to be (a) distinct from popular terms in the language, so that they cannot be blurred by common connotations not intended for the newly discovered patterns per se, and (b) descriptive and interpretive, but only to the degree justified by present knowledge. Since additional information accumulates as we

U.I. 17. INHIBITION OR TIMIDITY. The character of this personality dimension is clear and consistent up to the point of interpretation as a general timidity or inhibition. The only doubt arises between interpretation as a dispositional readiness to become inhibited (timidity) and a state of having *become* inhibited for reasons of personal history. Thus, the factor loads deliberateness in perception and judgment, slowing of reaction time by complex instruction, absence of questionable reading preference, and tendency to perceive many threatening objects (44, p. 239). U.I. 17 also correlates positively, to some extent, with questionnaire factor Q_3+, Self-Sentiment Control; F−, Desurgent depression; and H−, Threctia or timid threat susceptibility. All these *Q* factors are consistent with a concept of inhibition, though they do not fall in any one second-order *Q* factor, and the last two tend to distinguish neurotics from normals in the direction of their hypothesized association with U.I. 17 Inhibition (Table 4–2). In direct objective test evidence, U.I. 17 Inhibition associates with clinically judged neuroticism just short of the $P = .05$ level for the most typical neurotics we have, in R9-Ta. On the other hand, for the neurotics with socio-

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proceed through our findings, some of the titles and descriptive phrases will become modified in later chapters. But the key expression will always be retained to permit retention of identity, and, in any case, the Universal Index (U.I.) numerical system permits ready identification at any stage in the evolution of interpretation.

pathic trends (R10, Table 5–1), a significant relation exists in the direction of sociopaths being *less* inhibited, as one might expect. If further research confirms these trends, U.I. 17 may turn out to be a crucial distinguisher between neurosis and other types of personality disorder.

U.I. 19. CRITICAL PRACTICALITY OR PROMETHEAN WILL VS. RESIGNATION. At the positive pole of this factor, consistently related in all three groups to freedom from neuroticism, there is high, positive loading in per cent accuracy in gestalt completion, high analytic performance on Gottschaldt figures, high precision in general performance, and high social criticalness (44, p. 243). U.I. 19 is significantly higher in men than in women and probably identifies with a second-order questionnaire neurotic-contributory factor we have called F(Q)IV or Promethean Will *vs.* Resignation. It has substantial hereditary determination (44, p. 244; 72). Most of the variables which Witkin (228) has constructed to fit the idea of "independence of the perceptual field" are probably consistently loaded primarily in this factor, but the factor means more than a perceptual process and is tentatively interpreted as a temperamental aggressiveness *vs.* resignation. Presumably, the greater aggressiveness or critical practicality results in more solutions to problems of emotional deprivation and consequently to a lessening of the need for inner conflict.

U.I. 20. COMENTION VS. ABCULTION. The association with neuroticism is slight, in the direction of more neuroticism with greater conformity to approved social and cultural standards, labeled Comention. Comention loads acceptance of authority, high responsiveness to reality, honesty, absence of questionable reading preferences, and good performance in school. The childhood U.I. 20— pattern, indeed, shows incorrigible rejection of acculturation which may be associated with psychopathic tendency. Perhaps greater inner conflict occasioned by stronger attempts at conformity may account for the slight neuroticism association at the positive pole, but the relation is probably complex, since better integration with the culture may also in some situations reduce the occasion for external conflict.

U.I. 21. EXUBERANCE OR ENERGETIC SPONTANEITY. This is substantially related, negatively, to neuroticism. At the *non*-neurotic pole it loads good memory, fluency, speed of decision, endurance, and high basal metabolic rate (44, p. 247). It has high hereditary determination and falls off steeply through childhood with increasing age. Appropriately, it has some correlation positively with the alert, cheerful, non-neurotic Surgency of *Q* factor F, (see Table 4–2). Either some nervous energy or absence of inhibition are the favored hypotheses as to nature at the positive pole, but nervous energy seems to fit better.

The negative pole, lack of nervous energy, associates strongly with neuroticism ($P = .01$) but whether as a cause (low trial-and-error adaptability) or as a consequence (exhaustion of neural reserves) must be discussed later. There is some association of U.I. 21+ with creativity in children and with good performance when intelligence is held constant. However, the obstreperous and exuberant U.I. 21+ person is not too popular by sociometric count.

U.I. 22. CORTICALERTIA VS. PATHEMIA. At the positive, *non*-neurotic pole, this loads rapid reaction time (especially when asked to stay alert without any warning signal), high flicker fusion speed, high fidgetometer frequency, and descriptively is best designated as "an alert, eager, controlled, contact with external events" (44, p. 251). It is probably associated with a faster cortical alpha rhythm (44, p. 250), but is nevertheless a largely environmentally determined personality dimension. It can be hypothesized as a general high effectiveness and activity at the cortical level as contrasted with a retreat to hypothalamic, emotional, and unadaptive behavior.

This factor has the most substantial and consistent association with neuroticism (at the negative pole) of any known factor, and equally definite association is found with the second-order questionnaire factor F(Q)III or Pathemia which identifies with U.I. 22—. U.I. 22— also has a significant correlation with tendency to psychiatric breakdown in flying school (see AF-Sells, Table 5-1). The hypothesis developed later is that U.I. 22+, the *non*-neurotic pole, represents an upbringing favoring habits of handling emotional problems in a rational, conscious manner, rather than with emotionality and repression.

U.I. 23. HIGH MOBILIZATION VS. NEUROTIC REGRESSIVE DEBILITY (OR REGRESSION). At the positive *non*-neurotic pole, this expresses itself notably in low motor-perceptual rigidity, good two-hand coordination and good mobilization of personal habit resources generally. Taking an average between our findings (72) and those of Eysenck and Prell (89), U.I. 23 has a moderate genetic determination. Its associations with questionnaire factors are slight. The favored hypothesis is a general debility or regression of interest at the negative or neurotic pole, and a capacity to mobilize mental resources, at the positive pole. U.I. 23+ persons show a capacity to follow out an internally originated program, coordinating several habit systems, in the face of external or physiological distractions and impediments. The association of U.I. 23— with neuroticism ($P = .01$) may be because poor capacity to mobilize represents an ergic regression, predisposing to neuroticism as in the psychoanalytic explanation, or, alternatively, because the U.I. 23— condition represents the *result* of prolonged conflict as a form of debility or neuresthenia (193).

U.I. 24. ANXIETY. Anxiety is consistently higher in neurotics, but the relationship in objective tests is not as marked as the relationship appears in Chapter 4 for the questionnaire version F(Q)II. The U.I. 24 free Anxiety involvement in neurosis is noted only briefly here as one aspect of neurosis, pending an intensive treatment of the Anxiety factor later in the chapter.

U.I. 25. CAREFUL REALISM VS. EAGER SUBJECTIVITY. This factor appears to be similar to the one which Eysenck's clinical research group has named "psychoticism" (at its negative pole). We now prefer the title "subjectivity" because we have been unable to substantiate a significant association with type-defined psychoticism, and, indeed, the characteristics of U.I. 25—, although associated with neuroticism, include some positive traits of quick imaginative action, as well as those of low control. The stronger association with the R10 group, which included neurotics with alcoholic and drug records, agrees with the low control interpretation, while the greater association with the poor air flying school performance points also to personality defect more than neurotic conflict per se.

U.I. 26. NARCISTIC SELF-WILL VS. LACK OF SELF-INVESTMENT. This is a complex personality pattern involving strong self-sentiment development, determined control, cultured introspectiveness and exhibitionism (a George Bernard Shaw or D. H. Lawrence syndrome!). Contingently, we interpret it as a self-sentiment development through strong narcistic cathexis of the self, in psychoanalytic concepts. Its relation to neurosis may turn out to be important but is now obscure, since the significant negative correlation in the "beat" neurotics (R9-Ta) is contradicted by an insignificant positive relation in the better-educated and addicted neurotics (R9-Tb and R10).

U.I. 28. RIGID SUPEREGO VS. ZEPPIA. This is a complex pattern loading, at its positive pole, regard for authority, anxious and critical attitude to delinquent behavior, a curious combination of socially oriented and uncooperative, rigid, individualistic judgment, and a pervading asthenia. It has, since first named "sociable, emotional evasiveness" at its discovery, been variously called "the Hamlet factor," "Oedipal will structure," "precocious infantile behavior standards," "ambivalent introjection," "asthenia," etc., all of which convey acceptable descriptions of aspects of its totality. Essentially, our hypothesis is that it represents a product of development at about the 3–7-year-old period in which a fond but strict and dominant parent causes a precocious introjection of exacting behavior standards. At the same time, either because of disagreement of standards between the parents, or because of ambivalence toward the introjected ideal, there remains perpetual tension in relation to the resulting superego, showing itself in certain ambivalences and evasions, in general exhaustion and infertility of mind, and in irritability. At the opposite or negative pole is an uncomplicated, careless, amoral, energetic mind, the "let's-go" quality, which we have indicated in the questionnaire realm by the term Zeppia (J—), and which we retain here for lack of any common term sufficiently specific.

The striking finding here is the reversal between a significant positive relation to neuroticism in the typical neurotics (R9-Ta) and a significant negative relation in the sociopathic neurotic group containing drug addicts and alcoholics (R10). Like U.I. 17, this factor may turn out to be important in separating classical neurotics from other types of personality disorders, but further research is necessary, replicating these findings, before we can even be sure that U.I. 28 is neurotic-contributory.

U.I. 29. RESPONSIVE WILL VS. LOW ADAPTATION ENERGY. At the positive, *non*-neurotic pole the behavior here represents quick, adaptive, effective handling of a wide variety of environmental situational demands, as shown by high cursive miniature situation total score (29, p. 467), high immediate willed memory, and little distraction on a given task by shock or discomfort (44, p. 263). Like U.I. 23, its positive pole suggests effective deliberate control of resources, but it differs from U.I. 23 in being less the following-out-of-an-inner plan and more an effectiveness in alertly handling an environmental onslaught of events. As evidence for this, U.I. 29+ tests involve quick mobilization, high basal metabolic rate, but also ready relaxation after effort (G.S.R. skin-resistance recovery is good after emergency).

Since this is the factor with one of the greatest associations, negatively, with neurosis, it deserves far more extensive experimental study than it has yet been given, in the light of the above hypotheses. There are, alternatively, for U.I. 29+ chiefly two hypotheses. (i) It is essentially ego strength, dealing with alert capacity to mobilize internally and adapt in relation to external onslaughts. (ii) It is some form of high neuroendocrinal energy reserves, permitting rapid and effective adaptation. Both hypotheses are contingently implied in the bi-polar title, pending clarification. It may be some objection to the first hypothesis that nature-nurture research (72) shows this factor to be largely environmentally determined. An objection, perhaps, to the second hypothesis is the absence of any substantial relation of this factor to school achievement, indicating an immediate energy rather than a capacity for prolonged concentration, etc.

U.I. 30. STOLID INDEPENDENCE VS. NERVOUS RESPONSIVENESS. This factor loads in general slow body tempo, insuggestibility to authority, and variables indicating stolidity in the face of social demands. It is insignificantly negatively related to neuroticism generally (R9-Ta) and the significant positive relation to the neurotics containing alcoholics and drug addicts (R10) suggests relation rather to a sociopathic component.

U.I. 32. INVIA VS. EXVIA. This is the factor core in the verbal concept of introversion *vs.* extraversion. At the Invia pole it loads such objective tests as low fluency on one's own characteristics (inhibition by need of privacy), few objects perceived in unstructured drawings, high accuracy on gestalt completion, etc. The objective test battery and the corresponding second-order factor, F(Q)I, in the questionnaire medium agree in a moderate, but significant, relation of Invia to neuroticism. (It reaches the .001 level with the sociopathic neurotics.) The relation breaks down, however, and in fact reverses with psychiatric fitness over a higher range in the flying personnel.

U.I. 34. AUTIA. This is a new factor since the 1957 survey (44), but is attested by three studies (65, 188, 192). It loads high amplitude of voice in normal reading, questionable book preferences, less acceleration in competitive situations and several performances indicating little regard for social pressures. Appropriately, it correlates substantially with the M+ factor in the questionnaire series—Bohemianism or Autia. Both the objective test battery and questionnaire M are significantly, or almost significantly, higher in neurotics (Tables 4–2 and 5–1). Conceivably, this is a temperamental factor, making for maladjustment to, and rejection by, the social milieu.

Consistency of the First-Order Objective-Test Findings with Related Findings

Let us briefly examine the above conclusions regarding factors significantly associated with neurosis (notably U.I. 22—, 29—, 16—, and 23—) from the standpoint of possible checking by indirect evidence of any available kind. At the moment, such evidence is sparse, though we may expect it to mount rapidly in the next few years, as factored tests become more widely available. At present, we can only ask: (i) Is this selection of factors with definite neurotic associations consistent with that which would be made from our knowledge of the personality content or nature of the twenty principal *T* dimensions in terms of behaviors loading them? (ii) Are the associations of the objective test factors with questionnaire-rating factors those which would be expected from the known associations of the latter with neuroticism (Chap. 4)? (iii) Are there any other criterion associations known for these factors which are consistent with their relation to neuroticism?

As to the first question, in later chapters we shall from time to time touch on the face valid neurotic character of the tests simultaneously loaded on the neuroticism-associated factors in Table 5–1. In terms of the hypothesized characters of the twenty known dimensions, there is none having any suggestion of neurotic character that is missing from the first eight factors (those at approximately the $P = .05$ level or beyond) in order of neurotic association. The only *additional* factors one might expect to find associated are the three most recently discovered dimensions, U.I. 34, Autia, U.I. 35, Long-Circuited Dynamics, and U.I. 36, Strength of Self-Sentiment Development. The two last were not known in time for inclusion in our experiments, and U.I. 34 proves to be associated in the expected direction ($P = .01$), except that objective test data exist only for one group. Among the factors which Table 5–1 shows most highly associated with neuroticism, the direction of every relation found is quite consistent with the factor's content and meaning.

As to the second question above, the agreement is very good indeed between the findings on questionnaire-rating factors and the objective-test factors with which past work has shown them to be associated. In Chapter 4, neurotics were found to be significantly or almost significantly higher on second-order *Q* factors FI+, Invia; FII, Anxiety; FIII+, Pathemia; and FIV—, Resignation. The objective test factors matching these *Q* factors are U.I. 32+, 24+, 22— and 19—, and they also significantly differentiate between neurotics and normals in the same direction as did their associated second-order *Q* factors.

As for the third question above, the only substantial experiment yet completed on other criterion associations is one in which over two hundred U.S. Air Force cadets and officers were tested on sixteen objective test factors and at the same time assessed on a clinical examination as to a combination of psychiatric health and flying school performance. The details of the clinical evaluation are available elsewhere (71), but here, for greater criterion reliability, we have combined both criteria of adjustment used into a single score in the last column of Table 5–1.

The significant correlations with the above criterion, scored in the direction of *maladjustment* and *corrected for attenuation* on the basis of a 0.7 reliability, are: U.I. 1, —.36; U.I. 19, —.32; U.I. 20, —.44; U.I. 22, —.33; U.I. 25, —.29; and U.I. 32, —.22. Thus, maladjustment and poor performance (relative to the normal healthy range in the Air Force), considered to be roughly similar to *neuroticism* here, are associated with low intelligence, Resignation, Pathemia, and Subjectivity (U.I. 25—). Thus far the results agree well with those in the studies with typical neurotics and sociopathic neurotics (columns 1 and 2 of Table 5–1), except that U.I. 25—, Subjectivity, was not *significantly* associated with neuroticism in the typical neurotics of R9-Ta (although it is in the sociopathic neurotics) and, if anything, with *lack* of neurosis in the R9-Tb results. Perhaps the former relationship is related to the psychopathic tendency we have glimpsed at the negative U.I. 20—, Abcultion (rejection of culture) pole (see p. 70). At any rate, U.I. 20+ seems to contribute to approved social performance and adjustment in the Air Force, but at the same time slightly to clinically judged neuroticism in the general population. The major reversal in the Air Force indirect evidence is that, there, Introversion or Invia is associated with good adjustment, clinically and achievement-wise, while in the direct evidence (R9-Ta and R10), Introversion contributes to neuroticism.

With these exceptions, the lesser and non-significant correlations in the Air Force study are in the direction expected from the direct clinical results. With *maladjustment*, we have U.I. 16—, U.I. 17+, U.I. 21—, and U.I. 29—. U.I. 23 was not in this experiment and U.I. 24, as often noted with other criteria involving performance, had an almost zero relationship.

Other experimental findings which overlap ours are Biesheuvel and Pitt's (20) association of "primary function," essentially efficiency in response, with test measures akin to those in our U.I. 16, 19, and 22, in the expected direction (see 44, p. 238; 20). Also, we have the very extensive studies by Eysenck and his co-workers (86, 87) on a "neuroticism factor" which, as noted elsewhere (69, 193) is quite similar to our U.I. 23—. Eysenck's studies leave no doubt about this factor's strong association with clinically judged neuroticism *vs.* normalcy. However, in view of our multifactor results on the nature of neuroticism, we believe Eysenck is mistaken in interpreting his factor as *the* neuroticism factor, a mistake natural enough when one (a) factors largely in a sample of variables, which, because they have been found to distinguish neurotics, are assumed to be the only ones which do so, (b) omits the preliminary determination of general personality factor structure in the full range of the normal population, and (c) thus, errs, in our view, in making a serious *under*-extraction of factors. Actually, because of this under-extraction of factors, and also, in our view, incomplete rotation of them, Eysenck's neuroticism factor undoubtedly contains elements of factors other than U.I. 23. Thus, his single-factor theory actually involves in submerged form some but not all of the many factors we have found necessary to account for clinically judged neuroticism.

Admittedly, our studies are still on small samples, but the point is that despite this we have found highly significant differences on factors other than U.I. 23, significant for each sample and consistent across all samples. In a sense, the very size of Eysenck's sample—seven hundred for one of his basic studies (85)—means that even quite small differences, corresponding to very low correlations, become highly significant on a t-test. This naturally leads to the belief that the variables one has are most significant for defining neuroticism. A more cautious statistical logic, and a more comprehensive experimental approach in terms of the total measurable personality sphere, leads to very different conclusions, namely, that although U.I. 23 is very important in distinguishing neurotics from normals, it is only one of four or five equally or more important factors. Of course, there may be cultural differences between Britain (Eysenck's data) and the United States in clinical definition of the neurotic type, although our questionnaire results from British groups suggest that no differences of a gross nature exist (see footnote, Table 4–2). What is also possible here is a difference between Eysenck's long-institutionalized military neurotics and our primarily civilian sample whose troubles were not provoked by a war situation. Accordingly, until our sample is extended to several neurotic sub-cultures, we shall settle on no firm conclusion regarding the *relative* magnitude of association among the four or five most important differentiators (henceforth called the *neurotic process factors,* U.I. 16−, 22−, 23−, 24, and 29−) though we shall distinguish these from the less involved, *neurotic-contributory factors*—U.I. 1−, 19−, 21−, 25−, 32+, and 34+.

A good first approximation to type definition of neurosis, by a specific factor profile, has now been made, but gaps remain. First of all, are all the differences between clinically judged neurotics and normals to be accounted for in terms of objective test factors? The main data in Table 5–1 show some highly significant associations, but like all univariate designs, and by virtue of its exploratory character, it is incapable of telling us if *all* the differences concerned in clinically judged neuroticism have been accounted for. However, the multiple correlation between the five neurotic process factors and the clinical criterion has actually been computed and, while not perfect, is quite high: +.68 in R9-Ta and +.87 in R10. These values rise to +.76 and +.90 respectively when 11 neurotic-contributory (including neurotic-process) factors are included in the prediction equation. Also, preliminary data on the linear discriminant function for the R9-Ta study (Diagram 15–1, p. 463) reveal that the maximum likelihood, cut-off point misclassifies only 7 per cent of the persons in this study (normal *vs.* neurotic). Even from such preliminary data, it is evident that belongingness in the neurotic versus normal group can be predicted with a high degree of accuracy from objective test factor scores. Given the encouragement of the above figures, we can look forward eventually to measuring most of the reliable clinical criterion variance, especially when our already broad coverage is extended by newer additional objective test factors, such as U.I. 35 and 36. At least it is probable that the *T* factors do a better job of accounting for the total clinical criterion variance than the *Q* factors; for some type-defined, objective-tested neuroticism factors such as U.I. 21, 23, 28, and 29, do not correspond to any known questionnaire factors. It is thus probable that some aspects of neuroticism are intrinsically unmeasurable by ratings and questionnaires and can only be picked up in behavior tests, just as certain physical disorders cannot be fully diagnosed from the patient's introspections and observed disabilities, but only from biochemical tests. If so, this underscores our relative emphasis on more penetrating and broadly measuring objective tests, as contrasted with traditional clinical concentration on ratings and questionnaires. On the other hand, there may be second-order questionnaire factors yet undiscovered which would parallel differentiations now possible only in the objective test medium.

Type Definition of Neuroticism in Terms of Second-Order Objective-Test Factors

Just as with *Q* and *L* data (Chap. 4), so here, factor analysis can discover second-order dimensions in the correlations among first-order objective-test factors. As of 1957, this was a completely new realm, but we can already assemble five independent exploratory expeditions into it with good replication, so it is open to theoretical discussion. Rotations for simple structure and the determinations of the angles among first-orders have been thorough in these studies, usually extending to between ten and thirty overall rotations in each case.

Even before proceeding to factor the first-orders, it is revealing to look at the correlations among them, in terms of the primary studies. For example, calling all factors positive at the neurotic poles, U.I. 24 Anxiety is negatively correlated with U.I. 20 Comention in four correlation matrices; U.I. 23— Neurotic Debility or Regression is negatively related to Inhibition, U.I. 17; and U.I. 28 and 29 have almost exactly zero correlation.

If neurotics constituted one of very few types differing from the normal population, we should expect that in a random population, presumably ranging through normals and neurotics, the neuroticism-contributing factors would intercorrelate in a cluster, with signs of coefficients consistent with their direction of discrimination of neurotics. The fact that they do not do so suggests that (i) neurotics are not a discrete type, (ii) every other possible combination of these factors exists with roughly equal frequency, and (iii) there is something peculiarly unfortunate and disabling about the particular combination revealed in Table 5–2.

Statement (ii) is only true in a broad sense, for when the correlations of primary factors are examined it becomes evident that people are not distributed with exactly even density, because quite definite second-order factor structure appears. And although this second-order structure is more complex than is compatible with the existence of any single correlation cluster, the explanations of neuroticism which it offers are more convincing and enlightening than any concept of a single cluster would be. In fact, these organizing concepts in the second-order realm are as important for our thinking and calculation as the first-order concepts which they supplement.

Let us first examine the empirical evidence for these second-order factors. Since the O-A battery was published in 1955 (73), we have been able to accumulate second-order trait evidence from five approximately normal range population samples, C5, C6, R1, R2, and the Knapp study. (For particulars see Appendix I; 44, p. 884.) A definite simple structure for the second-order realm has been independently found in each case and there proves to be tolerable agreement as to the number and nature of the factors. The mean loading pattern from the studies is set out in Table 5–2, which uses Roman numerals for second order factors and adjusts verbal labels to agree with loading signs.

The full meaning of these factors must emerge from years of experiment. However, we shall state hypotheses about their meaning, discussed in connection with the findings about the ways in which they discriminate neurotics from normals. These findings are set out in Table 5–3, separately for the typical neurotics in R9-Ta against their socially equivalent normal control group, and the sociopathic neurotics, R10, against their comparable normals in Illinois. The statistics, as in Table 5–1, are expressed directly in t-tests. It should be remembered that our estimation of the factors is through only approximate weights (literally, the factor loadings) so that reduction of the truly existing significances is likely to have occurred.

The first of these factors, entitled clumsily but with maximum implication "Tied Socialization *vs.* Absence of Cultural Introjection," combines high regard for moral and physical laws, with high control, and—if our interpretation of the relatively new primary, U.I. 35, is correct—marked long-circuiting of dynamic need satisfactions. This picture might arise from something as broad as what is commonly called "character" or as specific as strong superego development. However, the presence of Extraversion and Comention and perhaps also low intelligence suggest that this is a result which may have been achieved especially by *a close socio-emotional tie of the child to the parent in early life* (our hypotheses for U.I. 28, which is a component

TABLE 5–2

NATURE OF SECOND-ORDER OBJECTIVE-TEST FACTORS: AVERAGE LOADINGS IN FIVE STUDIES

Note: C5, C6, R1, R2, Knapp, as described in Appendix I. A fuller report on the data presented here will soon be published (59a).

F(T)I Tied Socialization or Superego Development vs. Absence of Cultural Introjection

First-Order Factor (In direction of loading)	*Loading*
U.I. 20+, Comention	+.36
U.I. 1–, Low Intelligence	–.34
U.I. 25+, Careful Realism	+.33
U I. 35+, Long-Circuited Dynamics	+.44*
U.I. 28+, Rigid Superego	+.21
U.I. 19–, Subduedness or Resignation	–.20
U.I. 32–, Exvia or Extraversion	–.19

F(T)II Expansive Ego vs. History of Difficulty in Emotional Problem-Solving

First-Order Factor (In direction of loading)	*Loading*
U.I. 16+, Harric Assertiveness	+.34
U.I. 23–, Neurotic Regressive Debility	–.29
U.I. 1+, Intelligence	+.28
U.I. 19+, Promethean Will	+.23
U.I. 36+, Self-Sentiment Development	+.29*
U.I. 18–, Naive Self-Obliviousness	–.15

Lower loadings on U.I. 24–, Less Anxiety; and U.I. 33–, More Untutored Optimism.

F(T)III Temperamental Ardor vs. Low Dynamic Involvement, with Sublimatory Capacity

First-Order Factor (In direction of loading)	*Loading*
U.I. 21+, Exuberance or Energetic Spontaneity	+.31
U.I. 1–, Low Intelligence	–.28
U.I. 20+, Comention	+.27
U.I. 19+, Promethean Will	+.21
U.I. 27–, Keen Involvement	–.19

Lower loadings on U.I. 16–, Premsia; U.I. 26–,

F(T)IV Educated Self-Consciousness vs. Inexplicitness and Unrealism of Self-Sentiment

First-Order Factor (In direction of loading)	*Loading*
U.I. 22+, Corticalertia	+.31
U.I. 18+, Shrewdness	+.28
U.I. 36+, Self-Sentiment Development	+.51*
U.I. 25–, Imaginative Tension, Eager Subjectivity	–.17
U.I. 30–, Nervous Responsiveness	–.16
U.I. 29–, Low Adaptation Energy	–.15

F(T)V History of Inhibiting, Restraining Environment—Possibly, Bound Anxiety

First-Order Factor (In direction of loading)	*Loading*
U.I. 17+, Inhibition	+.36
U.I. 23+, High Mobilization	+.18
U.I. 31+, Wary Realism	+.15

Lower loadings on U.I. 16–, Premsia; U.I. 25–, Eager Subjectivity; U.I. 18–, Naive Self-Obliviousness; U.I. 26–, Lack of Self-Investment, and U.I. 32+, Introversion.

F(T)VII Tension to Achieve or Controlled Drive Tension Level

First-Order Factor (In direction of loading)	*Loading*
U.I. 24+, High General Level of Free Anxiety	+.40
U.I. 18+, Shrewdness	+.23
U.I. 30–, Nervous Responsiveness	–.19
U.I. 25–, Imaginative Tension	–.18
U.I. 19+, Promethean Will	+.16
U.I. 33+, Dourness	+.21*

Lower loading on U.I. 22+, Corticalertia.

F(T)VI Narcistic Development vs. Responsiveness To Environmental Disciplines

First-Order Factor (In direction of loading)	*Loading*
U.I. 26+, Narcistic Self-Will	+.33
U.I. 27+, Apathy-Fatigue, Lack of Keen Involvement	+.30
U.I. 34+, Autia, Bohemian Non-Conformity	+.51*

Lower loadings on U.I. 17–, Low Inhibition; U.I. 19–, Subduedness or Resignation, and U.I. 29–, Low Adaptation Energy.

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* This variable (first-order factor) appeared in only one study and thus has not been replicated.

here, also concur). Accordingly, this factor is hypothesized to be the broad organization of primary personality structure brought about by an historical experience of close rapport with the parent, resulting in powerful introjection of standards of morality and self-control at the most impressionable period. There would be no real objection, other than too great a leaning to psychoanalysis, to calling this factor "superego strength."

TABLE 5–3

DIFFERENCES BETWEEN NEUROTICS AND NORMALS ON SECOND-ORDER OBJECTIVE-TEST FACTORS

Factor Title, in Neurotic Direction, for "Typical" Neurotics	t-Ratios, with Sign Showing Direction for Neurotics on the Factor*	
	R9-Ta Study ("Typical" Neurotics)	*R10 Study* ("Sociopathic" Neurotics)
F(T)I+, Tied Socialization or Superego Development	+4.06	+2.64
F(T)II−, History of Difficulty in Problem-Solving	−4.44	−6.61
F(T)III+, Temperamental Ardor	+ .80	+2.34
F(T)IV−, Inexplicitness and Unrealism of Self-Sentiment	− .32	−3.86
F(T)V+, History of Inhibiting, Restraining Environment	+2.33	−2.80
F(T)VI+, Narcistic Development (positive pole) *vs.* Responsiveness to Environmental Disciplines	− .27	+5.63
F(T)VII−, Low Level of Controlled Drive Tension or Tension to Achieve	− .40	− .74

*A t-ratio of 2.00 is significant at the 5 per cent level while a value of 2.67 is significant at the 1 per cent level.

Table 5–3 shows that neurotics are higher than controls on this factor, at or beyond the P = .01 significance level in both of the main experiments. That higher superego strength should be somewhat more strongly associated with neuroticism in the typical neurotics than in the sociopathic neurotics, should surprise no one familiar with the notion of neuroticism as a by-product of cultural growth. In neurotics, generally, the social dependence in childhood has been overloaded, or at least used to affix desirable standards against id resistance very strongly. Presumably, it is special circumstances which later make the conflict intolerable.

There is some temptation at this point to utilize psychoanalytic concepts and simply designate Factor II as Ego Strength. The reservations o such identification are that (i) we see no grounds as yet for matchng F(T)II with the C factor in questionnaires which, with good grounds, has been called Ego Strength, and (ii) some qualities of the first-order factors involved suggest a spoilt person, egoistic, overrelaxed, untutored—a luxuriant and expansive ego rather than a strong ego. Consequently, we have preferred a hypothesis and label which does not necessarily tie us to the classical ego strength definition, but brings out rather the quality of an ego inflated by success. Nevertheless, we retain strong ego as a possibility because further research could yet prove that this is essentially the entity to which analysts have been applying the term ego strength. Certainly, Table 5–3 shows it to operate powerfully in the direction expected of ego strength, in showing neurotics to be way lower than normals on this factor. Here, there appear the largest t-values in the table, considering both experiments together, indicating significances beyond the .001 level.

Since these and the remaining second-orders will be discussed more fully in Chapters 12 and 13, when dealing with theory, our remaining comments will be brief. F(T)III appears to be some kind of "temper" or ardor as opposed to sublimatory capacity in the ergic needs of the individual. The high constitutional determination of most primaries grouped here suggests some innate quality of dynamic need, which, according to the U.I. 28 loading will also show itself in a rigidity and inexorableness of the individual's superego. Presumably, F(T)III favors neurosis principally by the inflexibility of dynamic demands and their obduracy to reason. However, it reaches significance (P=.02) only in the sociopathic neurotic group.

The second-order structure discovered in F(T)IV is a subtle dimension, suggesting "refinement" of upbringing, with emphasis on cortical handling of problems and a highly explicit, self-conscious, self-sentiment development. The trend to negative relation to neurosis (Table 5–3) might be expected because of positive endowments leading to the conscious treatment of conflict; but, on the other hand, too sensitive a self-sentiment might result in greater need for repression of the unacceptable. Conceptually, there may be some difficulties in differentiating this from the ego development of F(T)II, but this should not be serious, for we have here a more specific development than that of the total ego, namely, a self concept presumably embodying social and realistic standards and some moral standards projected from the superego. As might be expected, we encounter here a dimension on which the true neurotics (R9-Ta) and the acting-out sociopathic neurotics (R10) are not equally deviant from the normal group. The typical neurotics do not differ from normals significantly, though they run slightly lower in realism of self concept; but the sociopathic neurotics are far below normal at the $P<.01$ level.

It would seem that we are on the right track in interpreting F(T)V as "a history of inhibiting, restraining environment." Here, for the first time, we encounter a measure in which true neurotics and acting-out neurotics differ from the normal significantly in *opposite* directions. The possibility must also be considered that this is a dimension representing both the history of, and natural susceptibility to, inhibition.

Factor VI represents a consistent narcistic emphasis in development, as shown in the inflated self-will (U.I. 26) and the preoccupation with inner needs and indifference to environment (Autia, U.I. 34+, and Apathy, U.I. 27+), together with, at lower loadings, suggestions of low inhibition and low attention to adaptation. It would certainly be expected to relate more to psychopathy and to psychosis than to neurosis. In the outcome it is quite unrelated to typical neuroticism (Table 5–3) but very powerfully related to sociopathic neuroticism in the expected direction; that is, sociopathic neurotics are far higher than normals in Narcistic Development. This dimension should certainly be investigated with general psychotic and psychopathic groups.

Finally, on turning to F(T)VII, we encounter a dimension which, because of the highest loading falling on Anxiety, one might be tempted to consider some broader form of anxiety, covering both bound and unbound forms. This is a hypothesis seriously to be entertained, but the achievement-directedness of several associated factors seems to favor some such interpretation as "Controlled Drive Tension" level, or "Tension to Achieve." This is very slightly below normal, but not significantly so, for both kinds of neurotics.

Thus, in general, the examination of normal-neurotic differences in terms of the broader organizing second-order factors among the primaries leads to conclusions highly consistent with clinical concepts—indeed, in their relative simplicity and grossness, the second-order structures parallel the major clinical concepts closely whereas the first-orders are more specialized and technically new.

Trait Definition of Anxiety in Terms of Objective-Test Factor U.I. 24

Thus far we have found ample evidence of the multifactor nature of neurosis. Hypotheses about neurosis cannot be univocally applied to any single factor-dimension, but apply almost equally well to many such dimensions. In either first-order or second-order structures, clinically type-defined neurosis is a complex pattern. By contrast, the clinical concept of anxiety has been found to apply to a single second-order questionnaire factor, F(Q)II (Chap. 4), and we shall now show that this same factor has an equivalent expression as a single first-order factor, U.I. 24, in objective test behavior.

Factor U.I. 24 enters into neurosis but it is far from accounting for the main variance in neurosis. That it is correctly interpreted as a "general anxiety" factor, or at least the "free anxiety" factor is overwhelmingly attested by findings since its discovery. Following our usual procedure, we will first consider anxiety as a trait and in terms of face validity or semantic validity, i.e., the extent to which the U.I. 24 factor involves behavior which looks anxious clinically. We will deal with this evidence in two stages: first, the objective test behaviors associated with U.I. 24; and second, the relation of U.I. 24 to F(Q)II, the second-order *Q* factor already defined as anxiety. For purposes of exposition, this latter definitional relation is assumed to exist throughout the discussion of the first point above, prior to its demonstration in the second stage.

FACE VALID ANXIETY BEHAVIORS LOADING U.I. 24. Table 5–4 presents the loadings on U.I. 24 in a total of seventeen separate objective test studies. There can be no doubt of the persistence of the pattern through replications involving different samples of persons and variables, a point that has been discussed in more detail elsewhere, and confirmed precisely using the salient variable similarity index (66, p. 359).

As for interpretation of the nature of this pattern as anxiety, the first point is that our sample of variables was very large and quite exhaustive of the domain of putative anxiety tests. Hence, more than most other investigators, we are rid of dilemmas of the type such as, X behavior might have loaded if only it had been tried. The variables used sampled all that could be found at the beginning of these researches in a survey of several hundred articles suggesting anxiety tests and, in addition, many tests deliberately designed on the various theories that have been entertained by us in the course of research. Although Table 5–4 is extensive, it represents only the survivors of four hundred different personality tests—those with the most significant or consistent loadings—examined and replicated factor analytically. In all of the factor analytic researches here reported, these variables have been factored along with markers for other general personality factors to see if putative anxiety variables might group on any other factor.

A systematic discussion of the meaning of the variables in Table 5–4 has been made in detail elsewhere (66), where ten distinct possible hypotheses about the immediate nature of U.I. 24 have been examined.

TABLE

A COMPREHENSIVE LISTING OF OBJECTIVE TESTS LOADED ON THE

RESEARCHES (Designated as in Appendix

MI† No.	Variable Title	C5	C6	C7	BRO	ROS
219	More willingness to admit common frailties	42	19	34		38
152	More tendency to agree	24	63	39		26
211	More susceptibility to annoyance	52	39	08		49
108	More modesty on untried performance	11	03	23		
205	High emotionality of comment	35	13	05		
116	High ratio hard-headed/sentimental attitudes	28		37		33
274	High critical severity	01*		08*		
21	Restrained reading preferences	33		06	36	
(327-65)	Logical inconsistency in response	51		28		
176	Slow reaction time (irregularly warned)	06*	11*	34		06
464	Low writing pressure					
269	Slow tempo (leg-circling)	(04)	(03)	−02		
	Low fear erg (atom bomb)					
	High sex erg (romantic love)					
	High sex erg (satisfy sex needs)					
	High self-sentiment erg (self-respect)					
	Low self-assertion erg (political argument)					
307	Slow speed of perceptual judgment (letter comparison)	13	17			
308	Slow speed of perceptual judgment (no. comparison)	18	03			
271	High fluency (topics)	02	08	20		
30	High ratio self-criticism/criticism of others					
112	Low ratio favorable/unfavorable self-reference in events	11	16			
(67-150)	More "immoderation of statement" or "extremity of viewpoint"	08	06	24		
276	Good school grades			40	18	
274	High verbal ability	01*		13	55	
275	Good arithmetic reasoning			19	36	
31	Little fluctuation of attitudes	-06		-36		
144	Agreement with platitudes	10		47		
202	Low willingness to bluff in answering questions	02		24		
40	More response to false signals in reaction time	14	10	10		
120	High ratio accuracy/accomplishment			36		

5–4

GENERAL ANXIETY FACTOR, U.I. 24 (AT THE HIGH ANXIETY POLE)

I, where they are described)

R1	R2	R3	R4	R5	We	C8	C9	MR	D	G
37	33	11	50‡	49		03	28	58		
17	07	11	17‡	40		01	02	11		
15			38‡	42		52	79	46		
27	21	35	33‡	51		09		22		
			15‡	09			16	(-08)		
11	18	04	04‡			12	44			
	(-02)									
						03				
22	06	07				(-05)	05			
05	26	30	(-09)							
-29	-20	-03	-15			(18)				
-29	-16	-09								
41	09	05								
24	07	20								
02	-00	09								
-25										
						07*	23*			
						(-01)	11			
09	11	03				02	(-04)			
						13				
						18	(-26)			
12										
						(04)	-14			
							(-06)			
						(-14)	05			
13	04	(-04)				04	(-09)			

TABLE

MI† No.	Variable Title	C5	C6	C7	BRO	ROS
279	Low accuracy of prediction of time needed in task	–04	–16			
77	High, acid (pH) saliva (alkaline)					19
466	Low hand steadiness					22*
150	More extreme response in platitudes			24		
246	Agreement with authoritarian attitudes			39		
487	Smaller girth and length of bones					
486	Smaller girth and length of muscles					
	Low total physical strength					
96	Non-reduction of reading speed by frustration		–30	–09*		
53	High self criticism/self-approval ratio	19				
245	Less attempted detailed precision in time estimates			–32		
472	More loneliness (ratio acquaintances/friends)					
473	More loneliness (fewer total no. of friends)					
470	Faster rate of G.S.R. conditioning					
481	More susceptible to embarrassment					
294	Low contact with reality	45				
511	Faster rate of reading (undelay)					
482	More deprived or ambitious (self-checklist)					
509	Slower correct word rate (undelayed speaking)					
478	More deliberate (more latency of response)					
194	Shift of attitude away from trouble-makers			23		
5	High ratio regularly/irregularly warned reaction time	12		05		26
	Annoyance at personal vs. impersonal things			–17		
243	Annoyance at purposeful vs. non-purposeful	26		12		
287	More awareness of error			18		
107	Per cent adverse to total self-reference			08		
330	Good ethical choices in story situation				44	

5-4 (cont.)

R1	R2	R3	R4	R5	We	C8	C9	MR	D	G
										−43
(−07)	02	04								
05	04	09								
	28				04					10
	22				02					05
	25		(−09*)						28	
30	08	(−21)								
−27				−29						
25										
24			38	40				11		
16										
14										
−17										
12										
							(−01)			
(−01)	09	(−15)				01	03			
							(−12)			

TABLE

MI† No.	Variable Title	C5	C6	C7	BRO	ROS
	High Psychogalvanic Skin Response recovery quotient after startle					18
24	High ratio later-to-initial performance (reading backwards)	14	26	26		
97	Short length of estimated time while working			−15		
207	Good perception of human feelings			18		
447	More spread-out effort on an information test					
556	High strength per pound of weight					
340	Low speed of repetitive formboard performance					
73	Low Schneider Index					
520	Anxiety estimated from responses to a biographical inventory					
	Heart rate					08

Newly found U.I. 24+ "Markers" in only one study

M.I. 211a, High susceptibility to ego threat, +.50 (C8); M.I. 383, Much inhibition of criticism under social pressure, +.33 (C8); M.I. 363, More predominance of malevolent, external intervention over ego control in story completion, +.26 (C8); M.I. 439, Many deviant questionnaire responses, +.26 (C8); M.I. 388, Ratio other/self figure drawing, +.20 (C8); M.I. 359, Many extreme responses on susceptibility to annoyance, +.76 (C9); M.I. 335, Slow complex decision reaction time, +.26 (C9); M.I. 333, High readiness to learn new names, +.20 (C9); M.I. 402, Prefer social to solitary situations, +.21 (C8); M.I. 430, Prefer non-disturbing vs. disturbing pictures, +.27 (C9); M.I. 559, Poor performance on Cureton 18 item motor coordination test, 27 (We); M.I. 560, Poor performance on Cureton chin-vertical, jump-dip test, 31 (We); M.I. 560a, Few chins done, 29 (We); M.I. 560b, Few dips done, 36 (We); M.I. 560c, Few vertical jumps done, 16 (We); M.I. 579, Color-shock,

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* Variable was measured, administered, or scored somewhat differently in this study.

† Master Index Number identifying variables according to system employed in this laboratory.

5–4 (concluded)

R1	R2	R3	R4	R5	We	C8	C9	MR	D	G
	16									
			19		03					−19
						02	27			
	-04				-05					−25
14										
								30		

lack of difficulty in dealing with color, 32 (D); M.I. 577, Schmidt color form control, 32 (D); M.I. 588, Humor Factor 7—cold realism, 34 (R5); M.I. 591, Humor Factor 10—mistreatment humor, 23 (R5); M.I. 583, Humor Factor 2—good-natured play vs. dry wit, 17 (R5); M.I. 585, Humor Factor 4—flirtatious playfulness vs. gruesomeness, 16 (R5); M.I. 620, Increase of pulse rate to cold pressor stimulation, 70 (G); M.I. 622, Increase of pulse rate to shot stimulus, 74 (G); M.I. 621, Recovery of pulse rate after cold pressor, 50 (G); M.I. 623, Recovery of pulse rate after shot stimulus, 46 (G); M.I. 625, Response lag to cold pressor stimulus, −30 (G); M.I. 624, Response lag to shot stimulus, −64 (G); Plasma 17-OH, 43 (MR); Respiration rate, 45 (MR); M.I. 629, Little absolute rise in capillary resistance to cold pressor, −19 (MC); M.I. 630, Little per cent rise in capillary resistance to cold pressor, −27 (MC)

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‡ The values for these and several other loadings in the R4 study are lower here than as reported in a previous publication (63) because more stringent partial correlation techniques were used to produce a more conservative extension analysis estimate of the factor loadings. The present estimate is conservative and, if anything, an underestimate of the true factor loading.

They include the following:[4] that this behavior and introspective pattern represents Hypothesis 1 = Conscious Anxiety, Hypothesis 2 = Need To Achieve and/or Learning Facility, Hypothesis 3 = Tendency to Conform, Hypothesis 4 = Lack of Confidence or Lack of Self-Assurance, Hypothesis 5 = a generalized reduction of ability to cope with the environment, Hypothesis 6 = Self-Criticism and Guilt, Hypothesis 7 = Frustration without aggression, Hypothesis 8 = Ergic Tension or Undischarged Excitation, and Hypothesis 9 = identity with a particular second-order dynamic structure factor (44, p. 566).

All of these hypotheses may have some truth in that certain facets of the group of variables undoubtedly correspond to the given interpretation. However, any single one of them must be rejected as a complete interpretation by itself when it is required (a) that the explanation apply to all significantly loaded variables, and (b) that no variables fitting the explanation fail to load this pattern. To some degree, more than one of these hypotheses can be said to be "confirmed," so that ultimately we have to seek a concept which embraces, as part of itself, at least several of these descriptive hypotheses. But first let us discuss the descriptive hypotheses which are confirmed in such a way as to trait-define U.I. 24 in terms of an all-embracing concept of anxiety.

As for this being descriptively conscious anxiety (Hypothesis 1), the questionnaire anxiety-component factors and a checklist of conscious clinical anxiety symptoms are heavily loaded on the anxiety factor (Table 4–6) and scarcely anywhere else. We shall discuss this further when we get to questionnaire associates of U.I. 24. However, one cannot claim that the anxiety in U.I. 24 is only conscious anxiety because such variables as "tendency to agree," "severity of judgment," "muscle tension in writing," which also load, could represent *un*conscious anxiety.

Hypothesis 4—that U.I. 24 involves lack of confidence and lack of self-assurance—is strongly suggested by the loading of "lack of confidence in untried performance," Master Index 108, and several other variables (M.I. 30, 152, 202, 219, etc.), and, also, is suggested by smaller physical size, less muscular development, and other variables frequently discussed in the literature of inferiority and self-depreciation. It seems very probable that Edwards' studies (84) specifically of items in which a person makes a low estimate of himself in social value terms, are *not* really studies of an artifact in self-evaluative, questionnaire methods, but expressions of this real underlying factor—anxiety expressing itself in diminished self-confidence. As with conscious anxiety (Hypothesis 1), inferiority, self-depreciation, and lack of assurance seem to be face valid anxiety in the clinical sense. As to Hypothesis 5, there are admittedly signs of poorer intellectual performance, notably of increase of perceptual errors and decline of capacity to memorize; but these are much slighter than changes in these performances due to other factors such as low intelligence, Neurotic Debility (U.I. 23—), and lack of drive (U.I. 29—). We conclude that, in conceptual terms, impairment of cognitive performance is far from being the essence of anxiety, at least within the normal range, though it is slightly connected.

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[4] Some of these hypotheses about the nature of U.I. 24 are not confirmed. Our case for trait definition of U.I. 24 as Anxiety rests only on those that are confirmed.

Hypothesis 6 is a related one—that U.I. 24 involves self-criticism and guilt. It is provoked by the observation of good loadings in such objective tests as "willingness to admit common faults," "high ratio of self-criticism to criticism of others" and, in fact, all other self-criticism variables involved in our studies. However, U.I. 24 contains variables other than self-criticism and guilt and, therefore, is not completely identifiable with this concept. This justifies identification with anxiety to the extent that a guilt component is commonly included in the clinical description of anxiety.

Hypotheses 7 and 8 propose that U.I. 24 involves frustration and ergic tension. If confirmed, these hypotheses would align the factor with pre-metric concepts of the nature of anxiety, cited in Chapter 2 (p. 18). Frustration and ergic tension may be treated as aspects of a single more embracing concept, namely, undischarged ergic tension, and this undischarged tension may or may not be allowed an aggressive outlet. The indications are that anxiety arises when the aggression is not permitted. As to the central notion here that U.I. 24 may be essentially undischarged drive (ergic tension), regardless of mode of expression—such measures of tension and excitement as tremor, muscle tension, preference for more emotional reading, emotionality of comment, acidity of saliva, and susceptibility to annoyance—show loading in the direction expected. Indeed, the last is one of the most consistent and highly salient markers. However, "fidgetometer" frequency (a measure of restlessness), emotionality of word association, and a variety of distractibility measures which, by some concepts of tension and excitement would be expected to load, fail to do so.

Hypothesis 9—that U.I. 24 is identical with a possibly existing second-order dynamic factor, Total Ergic Need (44, p. 566)—can be checked by data from additional experiments, notably by direct use of the objective motivation strength measures whose validity has been recently clarified (44, 50). A single factor of simultaneously high tension level on all drives has not been found on factoring ergs; instead, there appear to be two groupings, namely, a low level of fear and a number of sentiment investments (career, religion, and narcism) are associated with a high level on sex and self-assertiveness (44, p. 566).

It is this factor, in the direction of high tension level of undischarged sex and assertion (aggression) which correlates quite well with our general anxiety factor (as checked by the components of second-order *Q* factor FII [44, p. 527]). By inference, it should be similarly related to U.I. 24, but direct data are not available and what exist suggest that this "undischarged sexual and aggressive tension" may also be correlated with some of the influences operating in Neurotic Debility, U.I. 23—.

Contingently, in so far as we accept the hypothesis of undischarged ergic tension (in this connection note also the prominence of "susceptibility to annoyance," M.I. 211, in U.I. 24, which is introspected annoyance rather than any real aggression), we must accept that this tension is to a considerable degree that of aggression and sex only. However, we would add that anxiety is most likely to arise when the person has settled down to an acceptance of sexual and other frustrations without discharging in aggression, so that both sex and aggression are suppressed. The tests, but not the life situation behavior, give evidence of this aggressiveness in the high loading of general annoyance and in high criticism, mostly turned back upon the self.

Hypothesis 3 is that U.I. 24 is cultural suggestibility or tendency to conform. This hypothesis arises from the high or consistently positive loadings on tendency to agree, agreement with platitudes, and agreement with authoritarian attitudes. Indeed, tendency to conform is often connected with anxiety on clinical grounds, it being proposed that conforming is a way of dealing with high anxiety, and that the conformist is "afraid to be different." U.I. 24 does involve this to some degree, but by reason of examination of other tests (see especially its loading by M, the *non*-conformity factor), it cannot be identified with it. However, this does bring out the curious relation of U.I. 24 to the main conformity factor, U.I. 20, Comention, a relation of interest in subsequent theoretical discussion.

The above discussion shows how Table 5–4 loadings confirm U.I. 24 as anxiety by trait definition, since U.I. 24 involves behaviors which clinicians designate "anxious," namely, conscious anxiety manifestations, lack of self-assurance, inferiority, guilt, frustration, high tension levels, etc. (see pre-metric hypotheses in Chap. 2). In further support of this trait definition we can mention other individual variables loading U.I. 24, for example, loneliness (M.I. 473), susceptibility to embarrassment (M.I. 481), high sex drive, etc. However, not all the hypotheses about the nature of anxiety are confirmed.

Hypothesis 2, hitherto by-passed because of special problems, is that anxiety is related to need to achieve and/or learning facility. This hypothesis has been limelighted by some learning theorists, who, however, have used anxiety to mean anything from fear to general drive strength, the precision of their learning measures being matched by no corresponding exactness in use of our present knowledge of personality drive measurement. With children in earlier studies (22, 59), positive correlations of anxiety and school achievement have been found, averaging about .25. But the relationship is lower with adults in the R1 study (192) and barely, if at all, significant statistically. Even with children, anxiety is far from being the most important personality and dynamic dimension to introduce into a specification (multiple r) formula for predicting achievement, because some of the first-order Anxiety component factors, notably C—, Ego Weakness, and Q_3—, low Self-Sentiment, are *negatively* related to scholastic achievement (thus, Ego Strength favors good use of intelligence), while other anxiety components, such as H—, Threctia, do tend to be *positively* related (62, p. 38, and p. 263 here). Also, our best evidence to date shows that other factors besides the anxiety components contribute importantly to scholastic achievement (62, p. 38).

The fact that U.I. 24 has zero relation to intelligence yet some positive relation to school achievement, verbal ability, etc., has suggested to some the hypothesis that anxiety can be equated with "need to achieve." But such a simple hypothesis is negated by the finding of zero relation to aspiration level, acceleration of effort by competition, endurance in manual and other ego-involved performances, amount of self-sacrifice S says he will undergo for life goals, time-distance of predicted achievement of life goals, tendency not to waste time, and accelerated response to increasing difficulty of task. The relation to the self-assertive drive, when the latter is measured as a definite factor in objective motivation devices, is actually significantly negative (see 44, p. 527, and Table 5–4 here). Finally, we have Bendig's evidence (14) that the Taylor Scale (212), known to be a good measure of our Anxiety factor (Table 4–6) has virtually zero correlation with McClelland's as well as with Edwards' scales for measuring "need achievement" (14). We conclude that although anxiety as a whole can be correlated somewhat with achievement in situations of insecurity (and classrooms may be such), U.I. 24 Anxiety is obviously not to be interpreted as need to achieve in any broad cultural sense, or in the definite sense of a biological erg of self-assertion. Our hypothesis is that U.I. 24 Anxiety is positively related to achievement only in a very specialized dynamic situation in which insecurity causes concentration on a particular kind of outlet, probably by increasing the total time spent on the activity.

As for that specialized learning which is classical reflex conditioning—and which, of course, is very different from intelligent, conscious, motivated school learning—our results show an r of about +.25 between U.I. 24 Anxiety and *rate* of conditioning of G.S.R. response, but only a slight non-significant connection with *amount* of G.S.R. conditioning and nothing with extinction rate. (Reported findings elsewhere, at P=.01 for a *difference* of two groups, could still be compatible with a very small correlation of the .20 order.) Contingently, at a level of conjecture, we hypothesize that this conditioning association will be found to be due to a single questionnaire component in Anxiety, namely, Q_4 or Ergic Tension level, not to Anxiety as a whole. Essentially, we are saying that the greater rapidity of conditioning is associated with excitation level (Q_4), not with Anxiety as a whole.

With thorough knowledge of the adult trait anxiety pattern established, we next went on to investigate the pattern in children in questionnaires (studies CQ3 and CQ4, Table 4–5) and in objective tests (studies C8 and C9, Table 5–4). The child questionnaire second-order pattern is found to approximate the adult very closely indeed, except that H−, Timidity, is much higher and the heretofore absent D, Excitability, appears for the first time (not measured in adults). This suggests that external fears and frustrations (Hypothesis 8) may be relatively more important in the etiology of anxiety in the child. This is further suggested by the quite outstanding loading of susceptibility to annoyance (irritability) in the children's objective test pattern (Table 5–4) which otherwise conforms tolerably well to the adult objective test pattern.

In summary, with the exception of the need to achieve and/or learning facility interpretive hypothesis, which is at any rate not too plausible or widely held by clinicians, U.I. 24's objective test loadings confirm it as anxiety by trait definition. In fact, anxiety content is pre-eminent in U.I. 24 and is not found consistently or extensively in any measured dimension except U.I. 24.

EXAMINATION OF U.I. 24'S IDENTITY WITH THE SECOND-ORDER QUESTIONNAIRE FACTOR, F(Q)II. In Chapter 4 we showed that second-order questionnaire factor II was the factor best aligned with clinical conceptions of anxiety, on both trait and type definition grounds. Therefore, U.I. 24's claim to the anxiety title will be clinched if we can show what has been assumed for the sake of exposition above, that it identifies with F(Q)II and is, in fact, only an objective test expression of it.

Table 4–5 showed thirteen studies establishing the second-order questionnaire pattern. Of these thirteen, seven included objective tests as well as questionnaires. In each of these seven studies (C5, ROS, R1, R2, R3, D, and G), the factor which in Table 4–5 was the second-order *Q* factor is now at the same time the U.I. 24 first-order *T* factor (see appropriate columns in Table 5–4). That is, in every case where both *Q* and *T* measurements were used, the second-order *Q* and first-order *T* patterns appeared together as the same factor. The second-order *Q* factor is thus an expression of U.I. 24 in an alternative medium and U.I. 24 is therefore *trait-defined* as anxiety by all the questionnaire-rating, anxiety-like characteristics of F(Q)II: high Ergic Tension, high Guilt Proneness, low Ego Strength, Timidity, presence of self-rated classical symptoms of anxiety, etc. (see Chap. 4). In summary, U.I. 24 qualifies as anxiety on trait definition grounds, not only by virtue of its own objective test content, but also by virtue of the face valid anxiety content of its *Q*-medium counterpart, F(Q)II. As the authors' monograph on this point discusses (66), no other objective test factor approaches U.I. 24 in the degree to which it involves anxiety manifest content.

It should be remembered that the whole of this chapter deals with anxiety in terms of stable individual differences. Special discussions of method (in Chapter 9) are necessary before we deal with anxiety as a fluctuating state. However, it may contingently be said that the state factor pattern is highly congruent with the trait pattern, and that the findings in Chapter 9 require no basic alteration of the conclusions here drawn.

Type Definition of U.I. 24 as Anxiety: The Factor's Relation to Psychiatric and Other Concepts, Especially of Free and Bound Anxiety

Although psychiatric evaluations have implicitly entered our judgment in identification of U.I. 24, notably in the questionnaire items, we propose to examine the identity more explicitly and, at the same time, to ask about the possible existence of some factors of modified anxiety, notably of free and bound anxiety. Actually, U.I. 24's identity with F(Q)II already provides sufficient evidence for its definition as anxiety, as stated above, since the confirming associations of F(Q)II with clinically evaluated anxiety occur in the R1 and MR studies (Table 4–6), which also showed the objective test U.I. 24 pattern loading the same factor as the F(Q)II pattern. Thus, like its *Q* counterpart (F(Q)II), U.I. 24 has a high and consistent association with clinically evaluated level of anxiety (see pp. 52 f.). That is, it picks out persons of high anxiety who were so clinically evaluated. Essentially, as with neuroticism, this is what we have called a type definition of the factor, e.g., a type of individual is picked out, socially or psychiatrically, and we then examine evidence to ascertain whether they differ significantly from normals on the factor-dimension which here we are calling anxiety.

However, it is not enough that type definition proves that U.I. 24 has a statistically significant, indeed, substantial relation to clinically evaluated anxiety. We also wish now to see if any other objective test factor relates significantly, just as we did with neurosis; and, if so, whether other factors deserve recognition as special forms of anxiety. This last, logically exhaustive inquiry can be done more comprehensively in the objective test than in the *Q* medium, since the second-order factors in the latter account for no more than four of the eighteen or twenty known objective test factors.

The present approach through a basic type definition of anxiety stemmed from an experiment in which psychiatric evaluations of anxiety were correlated with factor endowments on fifteen of the most important first-order objective test factors (64, 192).[5] The subjects were eighty-six young men, mainly college undergraduates, with the normal range of anxiety somewhat increased by inclusion of a preselected group of about a dozen persons unusually high and a dozen unusually low on anxiety, according to previous evidence.

These men were examined for a total of two hours of psychiatric interviews independently by two psychiatrists bent on determining the degree of anxiety in each. The psychiatrists were selected on grounds of their high reputation, particularly as diagnosticians. In viewpoint and theoretical school, one might be described as eclectic and the other as psychoanalytic with experimental orientation. Both rated total overall level of anxiety (10–20-point scales) while Psychiatrist I also made separate (5-point scale) ratings of free, bound, situational, and characterological anxiety. After initial briefing on definition, they worked completely independently of one another and without knowledge of our psychological test results on the same subjects. However, we were surprised to find that their separate ratings of total anxiety intercorrelated only +.24 by Pearson r.[6] Nevertheless, when examined by more sophisticated factor analytic techniques the picture becomes clearer and more comprehensible. When introduced into a factor analysis with all the rest of the 107 psychometric measurements on these 86 subjects, the psychiatric ratings show a more definite sense than when considered as disconnected correlations. The 107 measures introduced with the ratings covered the chief objective test factor-dimensions of personality. Table 5–5 presents the resulting factor structure, the loadings of psychiatric evaluations of anxiety on the eleven objective test factor dimensions already set out elsewhere (64) and discussed above. Omitted from the table are four other factors on which no psychiatric evaluations loaded significantly, namely, U.I. 16, 22, 23, and 26. The most striking fact emerging from study of Table 5–5 and related data is a confirmation of our selection of U.I. 24+ as the most central, type-defined factor of anxiety. Briefly summarized, the reasons are: (i) U.I. 24 is the *only* factor on which both psychiatrists' evaluations of overall level agreed in giving significant loadings. (ii) With minor exceptions, psychiatrically evaluated anxiety level loads on U.I. 24 more highly than on any of the other fourteen factors in the study. (iii) In another study of anxiety change-through-time (MR, Appendix I), first, psychiatric evaluations of anxiety also loaded more highly on U.I. 24 than on any of the other well-identified factors in the study and, second, loaded higher on U.I. 24 than did psychiatric evaluations of depression or anger. (iv) The Taylor scale (212), known to relate highly to U.I. 24 (Table 4–6 and p. 442), also relates to psychiatrically evaluated anxiety level (212).

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[5] As noted before, this parallels our procedure in the R9-T and R9-Q studies, where t-ratios were computed between neurotic and normal types for a range of factors. Essentially, a significant correlation between psychiatrically evaluated level of anxiety and a factor is statistically equivalent to a significant difference on that factor between high and low anxiety persons as psychiatrically evaluated.

[6] This value is somewhat low relative to interclinician reliabilities usually published (87, p. 33; 130, p. 61; 10), probably reflecting mainly the lack of conceptual clarity of the anxiety variable as understood by raters. In this connection, note that the reliability of clinical judgment in our own data is considerably higher for neuroticism as post-judged by degree of agreement of 16 P.F. profiles, presumably because presence *vs.* absence of relatively severe neurosis is easier to judge reliably than are anxiety level differences in an essentially normal range. Moreover, where better clinical reliability figures are obtained with similar variables, such as the correlations ranging from .31 to .70 in Grinker et al. research (10, p. 55 ff.), the agreement sometimes proves to be

Table 5–5 shows that, beyond U.I. 24, the objective test factors having some relation to rated total anxiety are idiosyncratic to each psychiatrist. Although in the present discussion we necessarily emphasize agreement rather than idiosyncrasy, the idiosyncrasies are important in throwing light on the origins of each psychiatrist's personal conception of anxiety. We have developed this theme elsewhere, suggesting that undergoing factor analysis (of perception pattern) as well as psychoanalysis, would be an excellent preparation for the practice of clinical psychology (64).

The only factors not yet tried out against clinical evaluations of anxiety are U.I. 27 through 31, U.I. 33, and U.I. 36. Most, but not all, of these contain little or no behavior that clinicians would call

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mediated by some common depiction of the actual data. For example, in the case just mentioned, the two evaluating psychiatrists were making their diagnoses from the same case reports prepared by a third psychiatrist; that is, there was a common interpretation and emphasis imposed on the interview data before it reached the two evaluating psychiatrists. As for our own anxiety rating results, we have discussed elsewhere some conditions which may have determined an unusually low interpsychiatrist relationship (63, 64).

TABI

LOADINGS OF PSYCHIATRIC EVALUATIONS

Universal Index Number of Factor	U.I. 24+	U.I. 21+	U.I. 19+	U.I. 34+
Brief Description of Factor at Positive Pole	Anxiety	Energetic Spontaneity and Exuberance	Critical Exactness or Promethean Will	Autia, Self-Direct Drive, or Non-Conformity
Evaluations				
A. Psychiatrist II Level of Overall Anxiety	+36**	−16	−22	+37
B. Psychiatrist I Level of Overall Anxiety	+30			
C. Psychiatrist I Level of "Free" Anxiety	+42			
D. Psychiatrist I Level of "Bound" Anxiety		−16		
E. Psychiatrist I Level of "Situational" Anxiety	+27		−15	
F. Psychiatrist I Level of Characterological Anxiety				

*See Table 10-3 for loadings on state factors (Anxiety, Pathemia, etc.) of psychiatric evaluations of anxiety, anger, depression. Table 5-5 data are for traits.

anxious, and thus can be discounted on trait-definition grounds, which usually correspond to type definition. Moreover, all of these factors are of relatively small variance (of relatively small importance in accounting for differences between individuals); hence, they would be unlikely to correspond importantly to a pervasive phenomenon such as anxiety. The essence of all the above findings is that, due to disagreements between the psychiatrists in relating their evaluations to other *T* factors, U.I. 24 is the only factor whose scores significantly and consistently (through psychiatrists and through studies) discriminate between clinically rated high and low anxiety cases.

At this point, as evidence converges on U.I. 24 as containing most of what are called anxiety manifestations, it is timely also to say what U.I. 24 is not. It is not, for example, the whole of what differentiates type-recognized neurotics from normals. Failure to understand this has led to much confusion in the derivation of "anxiety scales," notably iety on Personality Factor Dimensions *

8+	U.I. 20+	U.I. 35+	U.I. 32+	U.I. 17+	U.I. 36+	U.I. 25+
dness	Sociable Willingness to Please or Comention	Long-Circuited Dynamics	Invia or Introversion	Inhibition	High Self-Sentiment Development	Careful Realism vs. Eager Subjectivity
43	−33	+18				
	−33	+23	−28	−24	−20	
28	−23			+15		
16	−25	+28	+15			
-18	−33					+17

lus sign means that a higher level of anxiety, as psychiatrically evaluated, goes with positive pole of the factor as described in the column headings.

when scale constructors have taken as the criterion for an anxiety scale the fact that it should yield higher scores for neurotics than for normals. Actually, therefore, any attempt to purify an anxiety measure against a neuroticism criterion, as by item analysis, will necessarily import foreign validity (other factors) into the test and reduce its true construct validity (its ability to measure U.I. 24 only).

If we are correct in identifying general anxiety with this single first-order factor, U.I. 24, it is clear that the second-order objective test factor, F(T)VII, in Table 5–2, must be some more embracing concept, or some derivative of anxiety and other nervous personality dimensions simultaneously. The usual riddle of whether factor-loaded variables are causes or consequences remains and can only be answered by further research, now that the factor is delineated. Our favored hypotheses is that F(T)VII represents personality causes (U.I. 18, 19) and consequences (U.I. 24, 25—, and 30—) of a strong controlled drive tension. Anxiety would be one consequence because people with more irons in the fire have more cause for anxiety (see pre-metric hypotheses, p. 20). But the alternative hypothesis should be tried, namely, that these factors, notably U.I. 18 and 33, are radically distinct, alternative forms of anxiety. In other words, F(T)VII, rather than U.I. 24, *could* be called anxiety, with U.I. 24 as free anxiety, U.I. 33 as bound anxiety, U.I. 18 as compensative for anxiety, and so on.

Unfortunately, there is as yet only one main study in existence factoring psychiatrists' conceptions of anxiety along with numerous anxiety measures. The results are in Table 5–5, and slender though we know the basis to be, we must lean upon it for whatever tentative conclusions we would draw in this field. First we should note (Table 5–5) that much of the variance in psychiatrically evaluated anxiety, albeit idiosyncratic to each psychiatrist, falls *outside* U.I. 24. (We have claimed only that their *area of agreement* coincides with U.I. 24.) Secondly, Psychiatrist I's evaluation of overall level of anxiety was the simple, unweighted sum of his rated levels on free, situational, bound, and characterological anxiety. From column 1, we see that the portion of his overall evaluation which loaded on U.I. 24 was contributed to primarily by the free and situational components. On this evidence and on the evidence of manifest content of its other loading variables, which agree in involving a willingness to confess and admit to faults, we might conclude that U.I. 24 is a factor primarily in the type-defined area of *conscious, free-floating anxiety*. If this were acceptable, we should next look to see if a factor or factors can be found which correspond to "bound" or other types of anxiety.

Clinical concepts regarding the number and nature of forms of anxiety are quite fluid and vary widely among practitioners and theorists. One might nevertheless expect to find some firm foundation in such broadly entertained concepts as free and bound, conscious and unconscious, and situational and characterological anxiety (see Chap. 2, pp. 14 f.). But any experimentally obtainable distinction between a bound and a free anxiety factor can be no clearer than is this distinction in the minds and practice of the psychiatrists against whom our factors are checked. In so far as such practitioners have concepts which are different in name only, the concepts cannot be differentiated as factors. Although only one psychiatrist essayed the breakdown into types of anxiety, the evidence here is that the four concepts of anxiety do *not* link up with four distinct empirical factors.

Actually there is more agreement than disagreement in the factor composition of the four types of rated anxiety, at least between free and situational, and between bound and characterological. In general, where one type of anxiety loads a particular factor in a given direction, so do the other types. Clearly, only at the points where this agreement fails can we look for tentative evidence of factor-analytically distinct forms, such as bound or other non-free anxieties. To this fact that the four rated varieties of anxiety did not tend to have distinct loading patterns, we must add the fact that loadings of bound and of characterological anxiety tended to be lower throughout than those of free and situational. Therefore, in summary, we conclude that bound and characterological anxiety were not altogether clearly *separated* from free and situational anxiety by our psychiatrists nor, presumably, were they *recognized* and evaluated as clearly.

Although we may revert to what differences do exist in this psychiatric rating evidence, our search for bound or other non-free anxiety factors must henceforth tend more to emphasize conceptually understood characteristics of various personality factors, rather than concentrating on their known relationships to psychiatric evaluations (type-definition); that is, our treatment must be quite speculative and based on conceptual definition of bound anxiety. Let us for the moment consider that characterological anxiety may be only a form of bound anxiety. The warrant for this is that in Table 5–5 characterological anxiety loadings are the lowest of any and tend to parallel those of bound anxiety. Further, let us explicitly take as our criteria of bound anxiety: (i) The psychiatric ratings of bound anxiety, such as they are, show some tendency to greater relative loading on the factor. (ii) There is a relation to neurosis (*vs.* normalcy) on the cautiously applied assumption that neurosis involves bound as well as free anxiety. (iii) The experimentally found high-loading behaviors on the factor correspond to traditional conceptions of bound anxiety (just as in trait definition, but more speculative here).

SIZE AND PREDOMINANCE OF PSYCHIATRICALLY EVALUATED BOUND ANXIETY LOADINGS. We shall use as criterion here, not only the size of bound anxiety loading, but also the *discrepancy* between the bound and the free anxiety loadings. Our hypothesis, based on our understanding of Psychiatrist I's conceptualization and practice, is that he read *absence* of free anxiety as at least partially equivalent to *presence* of bound anxiety. The empirical warrant for this hypothesis is that in Table 5–5, except for the U.I. 20 column, bound and free anxiety either load in the opposite direction for any given factor or else one is present, the other not. On the above discrepancy basis, the factors most clearly involving bound anxiety are U.I. 17+, Inhibition; U.I. 21—, Lack of Exuberance; and U.I. 18—, Self-Obliviousness. In fact, most of the total anxiety loading in U.I. 18 comes from bound and characterological components. Much more faintly, the low free anxiety rating on U.I. 32+, Introversion, might suggest high bound anxiety, and similarly we might read some high bound anxiety into U.I. 36+, Self-Sentiment development. From the psychiatric rating evidence, slender though it is, an argument could be made for second-order factor F(T)V, History of Inhibition, being identifiable as bound anxiety, since it involves several of the above factors.

Relation to psychiatrically evaluated neuroticism, as theoretically indicative of bound anxiety. By common clinical consent (see 5, p. 31), neuroticism can involve bound as well as free anxiety as, for example, in obsessive-compulsive and phobic disorders. Results earlier in this chapter indirectly confirm this, for at least six or eight other factors besides U.I. 24 (free) Anxiety differentiate between neurotics and normals, and any of these could involve bound or other non-free anxiety. Of the factors listed in the criterion discussed above, U.I. 21−, decidedly, and U.I. 32+, moderately, show the expected relation to neuroticism. This we can therefore regard as additional indirect evidence that they involve or might involve bound anxiety. Among factors subsequently discussed as possible bound anxiety factors, we find higher in neurotics U.I. 23−, 28+, and, slightly, U.I. 20+. Other neurotic-contributory factors (see Table 5–1) are discussed no further here as bound anxiety, since they do not seem to qualify for the title on any other grounds.

Conceptually analyzed nature of factors indicating possible bound anxiety identification. Proceeding now independently of any known empirical relationships between factors and psychiatric evaluations, we shall describe those factors which on analysis of what is common to their high loading variables, appear to involve elements of what is commonly conceived of as bound anxiety. U.I. 17+, Inhibition, seems to qualify for the marked caution and deliberateness in it imply a general tendency to bind anxiety in useful, if rigid, precautions. U.I. 18−, Lack of Shrewdness, and U.I. 21−, Lack of Exuberance, have test-content showing the opposite of spontaneity, free output, and quick adjustment, and thus may involve bound anxiety. Possibly, U.I. 21 and U.I. 18 could be, respectively, the constitutional and acquired components in bound anxiety. However, there are fairly strong conceptual objections to considering U.I. 21− a form of anxiety, notably the evidence that the spontaneity of U.I. 21+ is a form of energy, possibly connected with basal metabolic rate in regard to the central nervous system. In this connection, note that U.I. 21 is high in young children and drops as maturity is approached (44, p. 617). Its absence is a long way from anxiety and seems to be closer to simple exhaustion. On the other hand, the possibility that U.I. 23−, Neurotic Debility, is a form of bound anxiety is sometimes suggested, notably by its large involvement in measures of rigidity and "inability to mobilize," but here again we doubt the identification, for external challenge actually tends to decrease Neurotic Debility (see Chap. 11).

Many clinicians might be tempted to consider U.I. 20+ as conceptually corresponding to bound anxiety, for the individual well endowed in it shows a rigidity and conformity of behavior which might be regarded as a generalized defense against anxiety. One can also see some resemblance in the dependency and unawareness of conflict in U.I. 20 to the conversion hysteria concept. If accepted as boundness, it would, however, have to be a constitutional tendency to bind, for U.I. 20 has a high hereditary determination (72). Somewhat against the bound anxiety interpretation is Psychiatrist I's putting bound anxiety at the *negative* pole of U.I. 20, though he does so as part of a rating which places *all* types of anxiety on the negative side of U.I. 20.

U.I. 28 is loaded by many of the same variables as U.I. 20. This overlap is so pronounced that much of what we have said about U.I. 20 as bound or unconscious anxiety in terms of test performance might apply equally or alternatively to U.I. 28. U.I. 28 is significantly neurotic-contributory in typical neurotics (R9-Ta), whereas U.I. 20 is only mildly so; but, unfortunately, U.I. 28 has never been checked against psychiatric evaluations of anxiety. It overlaps with U.I. 20 on seven or eight variables, all having the quality of agreeing with social and cultural values. The hypothesis for it stated earlier in this chapter, namely, that it represents an early familial (and possibly upper social status) imposition of cultural demands, would be consistent with production of bound anxiety.

Table 5–6 attempts to summarize the information we have discussed on first-order objective test factors possibly aligning with the clinical concept of bound anxiety. The factors are arranged tentatively in the order, from above downward, of likelihood that they may be demonstrably related to the psychiatrist's bound anxiety concept. Tendency to general Inhibition, U.I. 17, is the nearest thing. After this, we must consider the possibility that several factors exist, depending on the structures in which anxiety is bound. Thus, Rigid Superego, U.I. 28, has a claim to an expression of bound anxiety and guilt as does also the Self-Sentiment, U.I. 36. Introversion, U.I. 32, though certainly not commonly thought of in this way, would pass the three tests for bound anxiety. If introversion is, in many senses, restriction of the ego, then the turning inwards and inhibition of external action may be considered a way of binding anxiety.

Thus, until work can be done on a larger scale on psychiatric rating, we are compelled tentatively to come to these conclusions. (i) No other

TABLE 5–6

Summary of Evidence on First-Order Objective-Test Factors Involving Bound Anxiety

Objective Test Factor Title		CRITERIA OF BOUND ANXIETY INVOLVEMENT		
		Psychiatric Bound Anxiety Evaluation at This Pole?	Is This Pole Significantly Higher for Neurotics?	Does Conceptual Nature Suggest Bound Anxiety?
U.I. 17+	Inhibition	Yes, high	No, or questionable	Yes
U.I. 20+	Comention	No, all anxieties load U.I. 20–	Possibly	Yes, but also suggests unconscious anxiety
U.I. 21–	Lack of Exuberance	Yes, high	Yes, decidedly	Yes
U.I. 23–	Neurotic Debility	Evidence missing	Yes	Possibly
U.I. 28+	Asthenia or Rigid Superego	Evidence missing	Yes, probably	Yes, possibly
U.I. 32+	Introversion	Yes, tentatively	Yes	Yes
U.I. 18–	Lack of Shrewdness	Yes, high	No, U.I. 18+ pole is somewhat higher	Yes, tentatively
U.I. 31+	Wary Realism	No evidence	No	Yes, decidedly
U.I. 36+	High Self-Sentiment	Yes, very tentatively	Not known	Not discussed, but probably not

known personality factor rivals U.I. 24 in its claim to be the anxiety factor. (ii) If there are other forms of anxiety—notably *bound* anxiety tied to rigid, expiatory behavior performances and avoidances and *unconscious* anxiety producing losses of energy and other signs of unconscious interference—it is difficult to recognize them as single factors, though U.I. 17, Inhibition; U.I. 21−, Lack of Exuberance; U.I. 28, Rigid Superego; and U.I. 32, Invia, have some claims to bound anxiety and, possibly, U.I. 20, 21−, 23−, 25−, and 28+ to unconscious anxiety. (iii) It seems likely that the total of bound anxiety would show itself in stronger development of several distinct, defensive personality structures. Accordingly, we might expect to find it in second-order personality structures and in fact we do find in F(T)V a collection of first-order factors appreciably similar to those in Table 5–6 (U.I. 17+, 18−, 31+, and 32+; 23, however, is in an unexpected direction). This second-order factor, first hypothesized to be Restraint from an Inhibiting Environment, should therefore be investigated on a hypothesis of bound anxiety. Some negative correlation might be expected between F(T)V and F(T)VII as a check on this hypothesis, though a better proof of the exchange of bound for free anxiety could come from developmental and therapeutic longitudinal studies with accurate measures of U.I. 24 and the factors believed to represent bound and unconscious anxieties.

Scrutinizing a little more closely the five primaries indicated above as claimants to the concept of unconscious anxiety (but without the systematic treatment of Table 5–6) we find, from Table 5–5, that U.I. 20+ is negatively related to all types of rated anxiety, U.I. 21− tends to be negative, while evidence is lacking on the others. In general, the group of factors one might expect to involve unconscious anxiety has *some* resemblance to F(T)I, indicating Superego Development, and F(T)III, Ardor of Impulse, both of which might be expected to lead as causes of unconscious anxiety. This is very speculative, however.

Thus, in summary, over and above the main general anxiety factor, U.I. 24, we can see structures which are suggestive of the action of bound and unconscious anxiety and can state testable hypotheses; but, for lack of sufficient evidence, the conclusions here are altogether more speculative than those concerning the general anxiety factor. What the psychiatrist calls free and situational anxiety clearly flows into the general anxiety factor, U.I. 24; characterological anxiety is not analyzable out at the first-order *T* factor level (although anxiety-component *Q* factor H is worth looking into in this respect); but there are indications that bound and unconscious anxiety may show themselves by manifestations outside U.I. 24.

Summary

1. Objective personality tests are defined as behavioral, unfakeable (ideally) measures and are distinguished from questionnaire responses and ratings. The primary twenty personality dimensions replicated in several experiments with normal adult, child, and pathological groups are briefly described.

2. The five *T* data (objective test) factors on which neurotics differ from normals most consistently, highly, and meaningfully, have been called the *neurotic process factors:* U.I. 22−, 29−, 16−, 23−, and 24+. U.I. 24's greatest significance in discriminating neurotics from normals, comes in its questionnaire expression, as F(Q)II. It is included in the neurotic process factors largely because of its conceptual significance in understanding neurosis. The factors—U.I. 1−, 19−, 21−, 32, 25− and, possibly, 28 and 34—on which neurotics differ from normals at a lesser but still significant level have been called the neurotic-contributory factors. It is hypothesized that the former are relatively more involved in the neurotic process itself, whereas the latter are, relatively, only contributory to the maladaptation ending in neurosis. In general, the term neurotic process will henceforth designate a relatively more important subclass of neurotic-contributory factors.

3. The directions and magnitudes of difference between neurotics and normals make psychological sense in terms of the hypotheses previously tentatively confirmed regarding the nature and meaning of these factors.

4. Four of the first-order factors in *T* data are matchable from previous factorings with second-order factors in *Q* data. There is good agreement that when scores on these *T* data factors differentiate neurotics from normals the corresponding *Q* data second-orders differentiate neurotics from normals with similar significance and in the same direction.

5. The question is raised as to how completely the known neurotic-contributory factors account for the reliable information in clinical placements of persons as neurotic or normal. The conclusion is that much of this information is already accounted for by current objective test measurements, since the multiple correlation prediction of neurotic *vs.* normal (as clinically placed) from neurotic-contributory, objective-test factors scores is now, conservatively, about +.80. This value can be expected to become even higher as (i) an even wider range of objective-test factors is brought into the prediction equation, (ii) the reliability and factor validity of current tests is improved, and (iii) we are better able to correct for unreliability in the clinical evaluations themselves.

6. Repeated experiments have begun to establish that the eighteen to twenty *T* data personality factors fall into seven second-order *T* data factors. These second-order personality factors are interpretable as broader structures and organizing influences such as superego development, ego development, general level of inhibition produced by personal history, etc.

7. Neurotics differ from normals at about the P=.01 significance level on at least two of these second-order objective test personality factors. Specifically, they show weaker Ego Development, F(T)II, and stronger Superego Development, F(T)I, while the sociopathic or acting-out neurotics also show poorer Self-Sentiment development, F(T)IV—, and greater Narcistic development, F(T)VI. On F(T)V, History of Inhibition, the neurotics are significantly higher and the sociopaths significantly lower than the control normals.

8. One of the primary *T* data factors differentiating neurotics from normals is U.I. 24, which contains all the main manifestations of anxiety in test situations and is also identified as anxiety by aligning itself with the second-order anxiety factor among questionnaire and symptom checklist responses. Nine hypotheses about the essential nature of this dimension are examined, leading to the conclusion that, of all the objective test factors, it comes closest to involving behaviors clinically and semantically placed as anxious.

9. Psychiatric evaluations concur in identifying U.I. 24 by type-definition as the general anxiety factor, especially in free and situational anxiety, but these evaluations give no clear lead on other factors. However, some consistent structure among the suspected factors suggests that a second-order factor, F(T)V, expressing itself variously in U.I. 17, 23, 31, 16—, 18—, and 32 may represent bound anxiety in the sense of high acquired inhibition, while F(T)VII, with loadings on U.I. 24, 18, 33, 30—, etc., also deserves research as a possible generalized factor covering both unbound and bound anxiety. From content and associated psychiatric ratings, U.I. 20, 21—, 23—, 25—, and 28 deserve study as possible experimental entities fitting the concept of unconscious anxiety at the first-order level, while F(T)I and F(T)III are suggested at the second-order level. The clinical concepts of bound anxiety and of unconscious anxiety cannot be so clearly substantiated as the general anxiety pattern, particularly since in any given person they appear to be expressed in a least several distinct personality structures, which may also differ from person to person. Further research is required to test hypotheses relating the above factors to bound or unconscious anxiety.

CHAPTER 6

SUMMARY OF EVIDENCE ON TYPE-DEFINED FACTORS IN NEUROSIS AND ANXIETY: THEIR DISTINCTNESS FROM PSYCHOTICISM AS A DIRECTION OF ABNORMALITY

Thus far we have succeeded in isolating the factors most properly identifiable with the clinical concepts of anxiety and neurosis. We have found factor-dimensions involving characteristics clinicians would agree in calling "neurotic" or "anxious" (trait definition) and factors whose scores significantly differentiate between normals and clinically judged neurotics or highly anxious persons (type definition). Type definition was the primary criterion, but trait definition findings were generally consistent with it. We now propose to summarize and integrate the evidence which has been piling up quite rapidly and separately for various media of observation and for first– and second-order factor levels. But before doing so, we must consider one piece of evidence, omitted thus far in order to simplify the presentation.

Anxiety and Neuroticism Considered in Relation to Psychoticism

Type and trait definition have in common that, implicitly or explicitly, they relate anxiety and neuroticism to *normalcy.* The question is: do the neuroticism and anxiety differentiating factors *also* discriminate between neurotics and psychotics or between normals and psychotics? This is equivalent to asking whether neurosis and anxiety are actually functionally separable from psychosis. Obviously, if they are not separable, the factors now defined as counterparts of clinically conceived anxiety or neurosis may have to be broadened in clinical-conceptual meaning, becoming more general pathological factors of anxiety-psychoticism or neuroticism-psychoticism. Thus broadened, they would have less practical usefulness as the basis for factored, clinical-diagnostic measurements, since they could not separate psychotics from neurotics, etc. This issue is crucial in theory, too, for some psychiatrists and psychologists consider psychosis to be an extreme development of certain dimensions of unreality present in neurosis, while others, more cautiously, have said that some neuroses *may* develop into psychoses. However, the majority appear to have accepted at least some of the following types of evidence that these two mental aberrations are categorically distinct.

1. A larger hereditary component seems demonstrable in psychoses.
2. Considering the unreliability of psychiatric diagnosis generally, there is relative absence of confusion of psychotic and neurotic diagnoses.
3. The symptom picture and degree of disablement are quite different, except in some obsessional neuroses confusable with early schizophrenia and some resemblances of mania and hysteria.
4. There is a demonstrable dependence of some psychoses wholly on somatic disturbance and, even in the functional psychoses, on general physiological change, and such does not seem to be a prerequisite of neurosis.
5. Probably, but not certainly, neurosis is more closely related to situationally induced conflicts.
6. S. B. Eysenck's (90) analysis shows that the differences between normals, neurotics, and psychotics cannot be described in terms of one dimension in tests.

Phrased in terms of exact measurement, the question becomes: Does the psychometrically measurable pattern characterizing clinically judged psychotics differ significantly from the pattern characterizing neurotics and highly anxious persons? Available evidence shows that the patterns do differ, and hence that the anxiety factor and the neurotic-contributory set of factors are *not* identical with, or even very similar to, the psychotic-contributory factors. First of all, questionnaire factor sten values were contrasted for 480 clinically judged psychotics (unpublished data) and the 201 clinically judged neurotics in the R9-Q study (see Appendix I). The comparative data are presented in Table 6–1, both for first– and second-order questionnaire dimensions. While the large number of psychotics tends to ensure stability of data, it should be noted that 421 of the 480 in the sample came from one institutional center and only four or five different institutional groups were represented at all in any appreciable numbers, as contrasted with the ten-group dispersion in the R9-Q study. Moreover, the proportions of different types of psychotics in the sample are unknown.[1]

PSYCHOTICS VS. NEUROTICS (QUESTIONNAIRE EVIDENCE). Table 6–1 shows that the questionnaire-factor profile of the clinically judged

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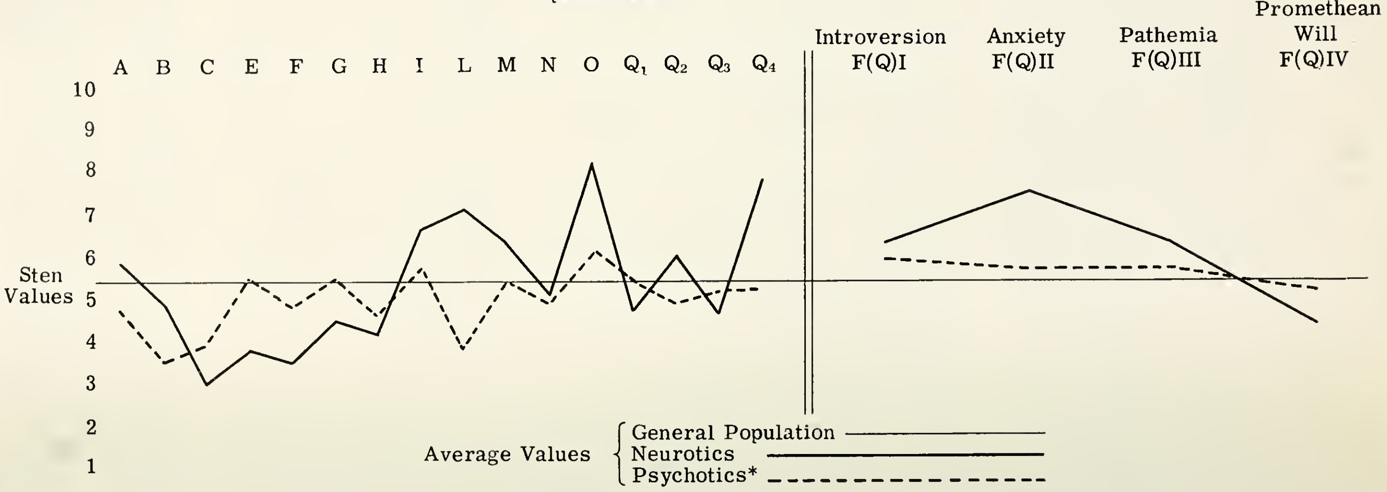
[1] However, the pattern-similarity coefficient (r_p), between the average profiles for 22 known schizophrenics and 11 known affective disorders in the sample, was quite high, +.77. Also, the sample of psychotics, like the sample of neurotics, was almost equally divided between males and females and the pattern similarity coefficient was very high, +.93, between 202 female psychotics and 219 male psychotics at one institutional center. The psychotics' pattern similarity coefficient averaged about +.45 between the main different institutional centers, as contrasted with an average of +.67 between the ten institutional centers used in the R9-Q study of neurotics.

TABLE 6–1

QUESTIONNAIRE FACTOR STEN PROFILES FOR 480 PSYCHOTICS VS. 201 NEUROTICS (ON 16 P.F.)

	A	B	C	E	F	G	H	I	L	M	N	O	Q_1	Q_2	Q_3	Q_4	F(Q)I	F(Q)II	F(Q)III	F(Q)IV
480 Psychotics	4.8	3.6	4.0	5.6	4.8	5.6	4.7	5.8	3.9	5.5	5.0	6.2	5.5	5.0	5.3	5.3	6.0	5.8	5.8	5.3
201 Neurotics	5.9	4.9	3.1	3.9	3.6	4.6	4.3	6.7	7.2	6.4	5.2	8.3	4.8	6.1	4.7	7.9	6.4	7.6	6.4	4.5

*Questionnaire Factors**



*The objective test evidence discussed in the text p. 113, confirms that psychotics are not significantly different from normals on factor M, Non-Conformity, F(Q)II, Anxiety, and F(Q)I, Introversion.

psychotic clearly differs from the neurotic profile. As contrasted with neurotics, psychotics are significantly more Dominant (E), more Schizothyme (A−), less Protense (L−), more Surgent (F+), less Guilt Prone (O−), less Tense (Q_4−), less Self-Sufficient (Q_2−), less Anxious (F(Q)II−) and less intelligent (B−), although the last could be at least partly an artifact of sampling. Psychotics also have almost significantly more Promethean Will, F(Q)IV, than neurotics.

PSYCHOTICS VS. NORMALS (QUESTIONNAIRE AND OBJECTIVE TEST EVIDENCE). As for questionnaire evidence, psychotics differ most significantly from normals (fixed at 5.5 stens) in having less Protension (L−), less Ego Strength (C−) and lower intelligence (B−), although again this latter could be at least partly due to artifacts in sampling. As for objective test evidence, a recently published study (R7, Appendix I) contrasted the scores of 50 clinically judged psychotics and 50 matched normals (age, sex, educational level) on objective test factors U.I. 23, 24, 25, 32, and 34. No significant differences were found on any of these five factors. The R7 study objective test results nevertheless confirm questionnaire results in the sense that they fail to show significant psychotic-normal differences where their questionnaire counterparts similarly fail. Thus, in R7 the U.I. 34 score is almost identical for psychotics and normals, just as is the case for its related questionnaire expression, M, or Autistic Non-Conformity, which in Table 6–1 shows for psychotics exactly the 5.5 general population sten value average. Similarly, psychotics in R7 were about the same as normals on objective test factor U.I. 24 Anxiety just as with its questionnaire counterpart, F(Q)II, in Table 6–1. The objective tests of R7 show psychotics to be perhaps slightly but not significantly more Extraverted (U.I. 32−) than normals, while on questionnaire evidence (F(Q)I), they are slightly more Introverted. Since the differences are slight and non-significant in each case, the best present conclusion seems to be that there is only a negligible difference along this dimension.

The preceding sections have provided ample evidence that the factors which distinguish adult neurotics from normals are *not* the same as the factors which distinguish adult psychotics from normals. To summarize, on the following dimensions neurotics tend to be significantly higher, while psychotics are significantly lower and at approximately the same level as normals: Resignation, Pathemia, Neurotic Regressive Debility, Anxiety, Invia or Introversion, Guilt Proneness, Submissiveness, Autistic Non-Conformity, and several others.[2] Said dif-

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[2] The exact index labels for these factors are, respectively: F(Q)IV−, F(Q)III+, U.I. 23−, F(Q)II and U.I. 24, F(Q)I+ and U.I. 32+, O+, E−, M+ and U.I. 34, all given at the neurotic pole.

DIAGR

Factors Identifiable with the Clinical Concept of Free Anxiety: Summ
First- and Sec

Clinical Concept	Factor-Dimension Equiva		
	First-Order Questionnaire (Q) or Rating (L) Factors		*Second-Order Questionnaire (Q or Rating (L) Fa*
Free Floating Anxiety	*Components are:* Q_4+ High Ergic Tension C− Low Ego Strength O+ High Guilt Proneness Q_3− Low Self-Sentiment L+ Suspiciousness (Protension)	group together as →	More Free Anxiety, F(Q)II+

ferently, this means that the above dimensions distinguish neurotics both from normals and from psychotics, but they do not distinguish psychotics from normals. They are among the most important neurotic-contributory factors, but they are *not* psychotic-contributory. On this basis we can claim that neuroticism is a direction of abnormality distinct from psychoticism, at least at the adult level, since adult psychotics can be shown to differ from adult neurotics in their psychometrically measurable characteristics. This fact of distinctness is all we had hoped to establish here. More complete specification of the nature and development of the observed differences must await further research (see p. 374), which should extend objective test coverage and link more securely with reliably diagnosed types of psychotics. Particularly, we need to discover which factors are *psychotic-contributory,* whether or not they are also neurotic-contributory. Practically every questionnaire and objective test dimension measured thus far shows psychotics at about the same level as normals.[3] This suggests, for further study, the hypothesis that psychoticism is in many respects

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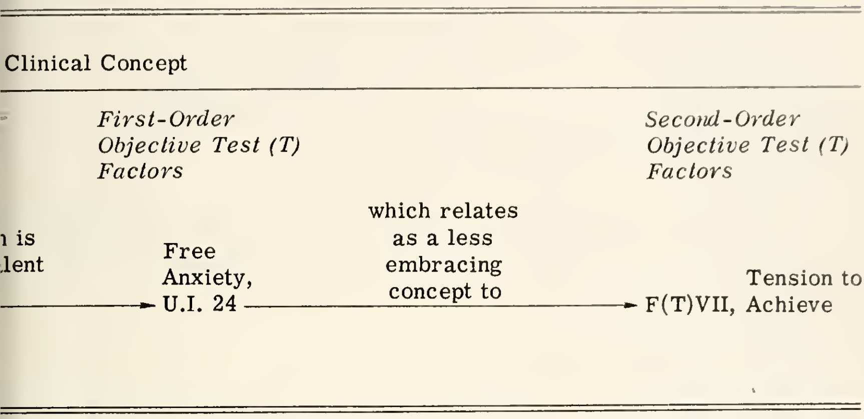
[3] Important exceptions to this are Ego Strength (C) which, at its low score pole, is both psychotic-contributory and neurotic-contributory, and Protension (L) which is psychotic-contributory at its low score pole and neurotic-contributory at its high score pole. Factor L thus permits separation of neurotics, psychotics, and normals in any combination. It therefore has promise for diagnosis as a factor determining whether abnormality will take a neurotic (L+) or a psychotic (L−) turn, but further research is needed to confirm the difference and, if confirmed, reinterpret the factor, for as it is presently interpreted we have the rather puzzling occurrence of *low* suspiciousness and *less* paranoid trend at the psychotic-associated pole.

Integration of Findings Through Media of Measurement and Through
er Factor Levels


Clinical Concept
First-Order Objective Test (T) Factors
Second-Order Objective Test (T) Factors
is
lent
Free Anxiety, U.I. 24
which relates as a less embracing concept to
F(T)VII, Tension to Achieve

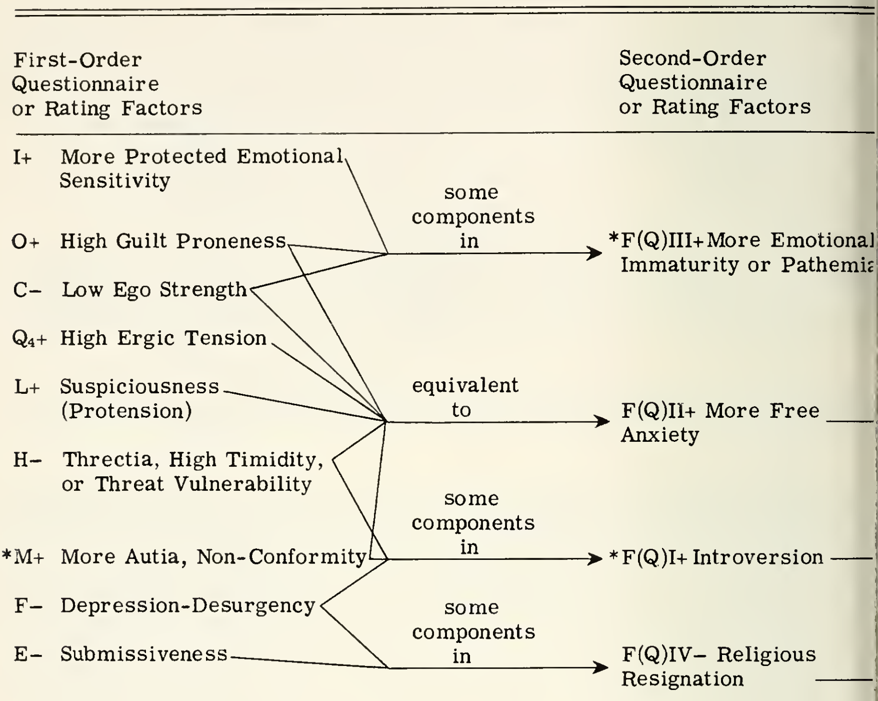
functionally closer to normalcy than neuroticism is! But it should be remembered that the psychotics, in order to be tested at all, had to be in a fairly advanced stage of remission, by means of medication or for other unknown reasons; hence, they do not necessarily represent psychoticism in general. And, too, even in remission, greater difficulties in motivation and attention are to be expected in the psychotic, eventuating in essentially random responses, which would in turn explain the flattening of the psychotic profile toward a consistently average value.

Summary and Integration of Factors Identifiable with Clinical Concepts of Anxiety

Having established that neuroticism and anxiety are functionally distinct from psychoticism, we can now summarize the definition of these clinical concepts in terms of factor-dimensions. Only type-definition results are given, since these are more important and reliable than trait definition and, moreover, tend generally to conform to it in the factors selected. Diagram 6–1 summarizes for free anxiety the conclusions of Chapters 4 and 5. The more speculative conclusions concerning bound and unconscious anxiety are presented in the text following. Essentially, the conclusions for anxiety are: first, *Free Anxiety* is most properly identified with first-order, objective-test factor U.I. 24, which is equivalent to second-order questionnaire factor II, which is in turn contributed to primarily by five first-order *Q* factors: Q_4+, $C-$, $O+$, Q_3-, and $L+$. Second, *Bound Anxiety* seems to be a many-faceted phe-

DIAGRAM

Factors Identifiable with the Clinical Concept of Neurosis: Summary and
First- and Second-


First-Order Questionnaire or Rating Factors
Second-Order Questionnaire or Rating Factors
I+ More Protected Emotional Sensitivity
O+ High Guilt Proneness
C− Low Ego Strength
Q4+ High Ergic Tension
L+ Suspiciousness (Protension)
H− Threctia, High Timidity, or Threat Vulnerability
*M+ More Autia, Non-Conformity
F− Depression-Desurgency
E− Submissiveness
some components in
equivalent to
some components in
some components in
*F(Q)III+ More Emotional Immaturity or Pathemia
F(Q)II+ More Free Anxiety
*F(Q)I+ Introversion
F(Q)IV− Religious Resignation

* Factor approaches but does not quite achieve significance as type-defined

nomenon, aspects of which may be expressed in Inhibition (U.I. 17+), Rigid Superego (U.I. 28+), Introversion (U.I. 32+), Low Exuberance (U.I. 21−), Naive Self-Obliviousness (U.I. 18−), and several other factors. Since bound anxiety can apparently be incorporated in at least several distinct personality structures, any one-to-one identification of the clinical concept with a factor is somewhat unrealistic. Still, if such is desired as an approximation, the closest counterpart seems to be

6–2

Integration of Findings Through Media of Measurement and Through Order Factor Levels

	Main Established First-Order Objective Test Factors		Main Second-Order Objective Test Factors
approximately equivalent to →	U.I. 22– Pathemia or Low Cortical Alertness	some of which are involved in →	F(T)I+, Tied Socialization or Superego Development and/or F(T)II–, History of Difficulty in Emotional Problem-Solving (ego not expansive)
equivalent to →	U.I. 24 Free Anxiety		
equivalent to →	U.I. 32+ Invia or Introversion		
approximately equivalent to →	U.I. 19– Subduedness or Resignation		
no definite Questionnaire equivalents known, at least at the second-order Q level	U.I. 23– Neurotic Regressive Debility U.I. 29– Low Adaptation Energy U.I. 1– Low Intelligence (but not significant as Factor B, 16 P.F.) U.I. 16– Premsia or Low Harric Assertiveness U.I. 21– Low Exuberance		

second-order objective test factor F(T)V, History of Inhibiting, Restraining Environment. This factor involves several of the first-order "defensive" structures cited above. Third, *Unconscious Anxiety,* like bound anxiety, seems to be expressed in a number of distinct first-order structures, among them Comention (U.I. 20+), Neurotic Regressive Debility (U.I. 23—), Lack of Exuberance (U.I. 21—) and Imaginative Tension (U.I. 25—). At a more general second-order level, we have speculated that unconscious anxiety may be involved in either or both of two factors: F(T)I, Tied Socialization or Superego Development (associated with repression), and F(T)III, Temperamental Ardor of Impulse. The bound and unconscious anxiety factor identifications are quite tentative and in no way threaten our major conclusion that most of the variance in overall, free anxiety is accounted for by one factor, U.I. 24, with some broader representation of anxiety possibly existing in second-order factor VII, Controlled Drive Tension, on which U.I. 24 loads saliently.

Summary and Integration of Factors Identifiable with the Clinical Concept of Neurosis

Diagram 6–2 summarizes the main findings on type-defined factors in neurosis and should be self-explanatory without further discussion. This diagram dramatically illustrates the complex multifactor nature of neurosis. Note again that Anxiety, U.I. 24, is only one of these dimensions—part of neurosis but not all of it. Diagram 6–2 would have been even more complex had we chosen to include all factors which approach significance as neurotic-contributory (for example, U.I. 25— and 34+, discussed in Chapter 5). For actually, there is a gradient in degree of significance of neurotic-contribution and no clear cut-off point exists between factors which importantly differentiate and those which do not. This reinforces a point that has cropped up in several contexts in our discussions, namely, that the entire personality affects the incidence and expression of neurosis. Given this complexity of factor analytic definition of clinically conceived neurosis, we have the problem of choosing the medium of measurement and factor-order level which most efficiently handles the available information. Diagram 6–2 suggests that first-order objective test factors apparently capture most of the information in *Q* factors, by virtue of their relationship to second-order *Q* factors which in turn involve much of the information in first-order *Q* factors. Any defect of coverage stems from the fact that, except for F(Q)II, second-order *Q* and *L* factors do not solidly account for all the information in first-order *Q* and *L* factors. (That is, some first-order *Q* factors which should appear in the second-order *Q* factors, are *not* by themselves neurotic-contributory, and some first-order contributories do not load saliently on the second-orders.) But in general, first-order objective test factors provide most of the information in questionnaires and, in addition, some information which, currently, at least, cannot be picked up in questionnaires and ratings. Moreover, second-order objective-test factors do not yet come near to accounting for all the information in the first-order objective test realm. In view of the above, we conclude that the first-order objective test realm (column 3, Diagram 6–2) most efficiently and completely describes the available neurotic-contributory information in *T*, *Q*, and *L* media of measurement. The *Q* and *L* information it misses can be picked up in the first-order questionnaire realm.

We consider it likely that the factors described are exhaustive or very nearly exhaustive of the reliable information in clinical judgments concerning neuroticism *vs.* normalcy. That is, we believe the differentiations achieved closely approach the limits set by reliability in the clinical diagnosis itself.[4] This is less surprising when one remembers that the measurements tried out against clinical judgment criteria covered the entire known range of measurable personality.

Summary

1. Preliminary evidence is given to show that, measurement-wise, psychoticism is a direction of abnormality distinct from neuroticism and anxiety. As a rule, neurotic-contributory factors are not psychotic-contributory, that is, the neurotic-contributory factors discriminate between neurotics and normals, and between neurotics and psychotics, but they do not discriminate between psychotics and normals.
2. Type definition data from the two previous chapters are reviewed and integrated in a resumé of factor-dimensions which are the precise measurement counterparts of neurosis and anxiety.
3. Summaries later in this book (especially pp. 286 ff.) integrate the foregoing basic data with data now to be described in Chapters 7 through 11.

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[4] There is already some good evidence on this point, namely, the fact that the multiple correlation is very high between the combined neurotic-contributory factors and the clinical criterion of neurosis *vs.* normalcy, the figure being +.76 in the R9-Ta study and +.90 in the R10 study. See also discussions in Chap. 5, pp. 77 f., and Chap. 15, p. 462.

CHAPTER 7

INDIVIDUAL DIFFERENCES IN THE EXPRESSION OF NEUROSIS AND ANXIETY

Importance of Understanding Mode of Individual Expression

The preceding chapters established the major factor-dimensions which distinguish clinically judged neurotics or highly anxious persons from normals. But it is a commonplace that no two patients will express a given overall level of neurosis or anxiety in exactly the same way. Such individual differences in expression give recognizably different qualities to the patient's behavior and suggest different pathological influences at work, requiring specially appropriate diagnoses and therapy.

Test or Factor Profiles as Descriptions of Mode of Expression

How can the factor analytic model be used to describe individual differences in the expression of neurosis and anxiety? The basic answer is that the same total score on a factor can be achieved by different combinations of the component variables loading that factor. For example, F(Q)II, the second-order *Q* factor identified with free anxiety, is loaded by Ergic Tension, Guilt Proneness, etc. Other things being equal, an individual with higher Ergic Tension and lower Guilt Proneness will have the same overall level of F(Q)II Anxiety as does an individual with lower Ergic Tension and proportionately higher Guilt Proneness; but there is a different pattern or profile of component contributions, which is to say, a different *mode of expression,* emphasizing Guilt in one case and Tension in the other. Similarly, for the objective test expression of Anxiety, U.I. 24, the same total level can be produced by various proportions of contribution from component behaviors such as susceptibility to annoyance, loneliness (few friends), etc., and the same total severity of neurosis can be produced by various combinations of Desurgent Depression, F— ; Submissiveness, E— ; Neurotic Debility, U.I. 23— ; Emotional Immaturity, U.I. 22—, etc. In a factor analytic approach, the components in terms of which individual differences express themselves are usually relatively distinct functional influences, for example, the several first-order factor components in F(Q)II Anxiety, or the essentially uncorrelated first-order objective test factors which contribute to total level of neurosis. This is a crucial point both for research and practice. It means, for example, that even at the same total level of neurosis, a U.I. 22 or Pathemia-salient pattern of expression is to be understood and treated quite differently from a U.I. 23 or Debility-salient pattern of expression, for the statistical distinctness of these two dimensions makes it quite certain that they differ radically in etiology and in the types of situations, stimuli, etc., which will cause change in them.

Direct Type Definition of Neurosis and Anxiety Expression in Terms of Clinically Segregated Syndrome Groups

Given a breadth of measurement covering all or most of the type-defined factors in neurosis and anxiety, the yield is not only total level of severity of pathology, but also a profile specifying mode of expression. Both these types of information can then be used in deciding diagnosis, prognosis, and therapy. For practical clinical purposes, the profile-model discussed above can function well on the basis of data already analyzed in this book. However, one flaw is that such profile analysis would be based only on factors which are type-defined in terms of neurosis in general (i.e., in terms of a sample which mixes neurotics of several different clinically recognized types). Thus, although differences in profile of neurosis-components refer to real differences in etiology, expression, and course of neurosis, we do not yet know how these differences link up with traditional clinically recognized neurotic syndrome groups. Therefore, following our canon of interlocking as closely as possible with clinical concepts, we shall directly type-define factors on several sub-groups of clinically judged neurotics. That is, we shall determine and compare the factor profiles for groups of patients placed clinically in several different neurotic syndrome groups.[1] Unfortunately, only questionnaire evidence is now available on this research frontier. Our sample was chosen primarily from among the 201 neurotics of the R9-Q experiment (Chap. 4). But whereas there we were interested only in gross neurotic-normal differences, here we utilized only those subjects for which more detailed clinical diagnosis was available in the following syndrome groups: (a) Anxiety Reaction or "Anxiety Hysteria"—indexed as 40.0 in the American Psychiatric Association's classification manual (5), (b) Depressive Reaction (40.5), (c) Conversion Reaction (40.2), (d) Obsessive-Compulsive Reaction

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[1] There is no parallel development for clinically segregated anxiety syndromes, since, as Chaps. 2 and 5 discussed, such categories are not very clearly conceived and recognized clinically. Free overall anxiety seems to be the major category, namely, U.I. 24 and F(Q)II, but Chap. 5 also suggested tentatively factor counterparts for bound and for unconscious anxiety. In terms of the present discussion, these may be cautiously interpreted as factor analytic counterparts of individual differences in the expression of anxiety, e.g., free, bound, or unconscious.

(40.4), (e) Psychosomatic Disorder or Somatization Symptoms, (f) Psychopaths, and (g) Sociopaths. The last three are not included as neurotic syndromes in the APA classification manual (nor were the people in these groups in the R9-Q sample), but even so they are often considered to be neurotic or to manifest neurotic-related syndromes.

Cases were spread over twelve hospitals, clinics, and private practices in order to suppress individual biases in the diagnostic perceptions resulting from but one psychiatrist or from the local cultural types in one area. We believe that the data presented in Table 7–1 represent a good beginning in understanding the psychometrically measurable differences between psychiatrically placed neurotic syndrome groups, but further data are needed on objective-test as well as questionnaire measures, and even for the latter, sample size must be expanded.[2] We hope that other psychologists will improve this exploratory study, by obtaining more cases and by ascertaining coefficients for the reliability of clinical syndrome group placements. The latter will permit correction for attenuation and a surer decision as to the extent to which certain failures to obtain significant differences are due to diagnostic unreliability.

Table 7–1 presents the basic data in sten values for each of seven clinically segregated syndrome groups on sixteen first-order questionnaire dimensions and four second-order questionnaire dimensions, the latter computed exactly as in Chapter 4. The sten average for the general population is, as usual, standardized at 5.5 with each full sten-point equivalent to one-half a raw score standard deviation.

Table 7–1 is a rich mine of information for both the practitioner and the researcher. However, pending increase in the size of sample and in view of space limitations, only the most salient points will be summarized here. Our main purposes are to show how clinically placed syndrome groups are differentiated in terms of questionnaire, test-measured dimensions, and to indicate very briefly the significance of these results for theory and practice relating to the expression of neurosis and anxiety. We hope only to lay empirical foundations which will stimulate the growth of theory, hypothesis, and fruitful research.

The data will be approached in two ways: first, dimension by dimension, in terms of the way each dimension discriminates between syn-

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[2] Because of small sample size, the Phobic Reaction and Dissociative Reaction categories were dropped entirely from the present analysis. However, the frequency of diagnoses in these categories is apparently so low as to make them relatively unimportant for practical purposes. A tabulation of clinically diagnosed psychoneurotic reactions in Illinois Mental Health Service Institutions as of June, 1958, reveals that of a total of 485 neurotics only three were diagnosed as Phobic and only ten as Dissociative Reaction. (Personal communication from Dr. Phyllis W. Huffman, Chief, Psychology Service, Illinois Department of Public Welfare.)

DIAGRAM 7–1

The Syndrome Groups Which Are Highest and Lowest on Each of Sixteen of the Most Significantly Discriminating Questionnaire Dimensions

(Graphic Summary of Table 7–1)

Questionnaire Factor-Dimensions

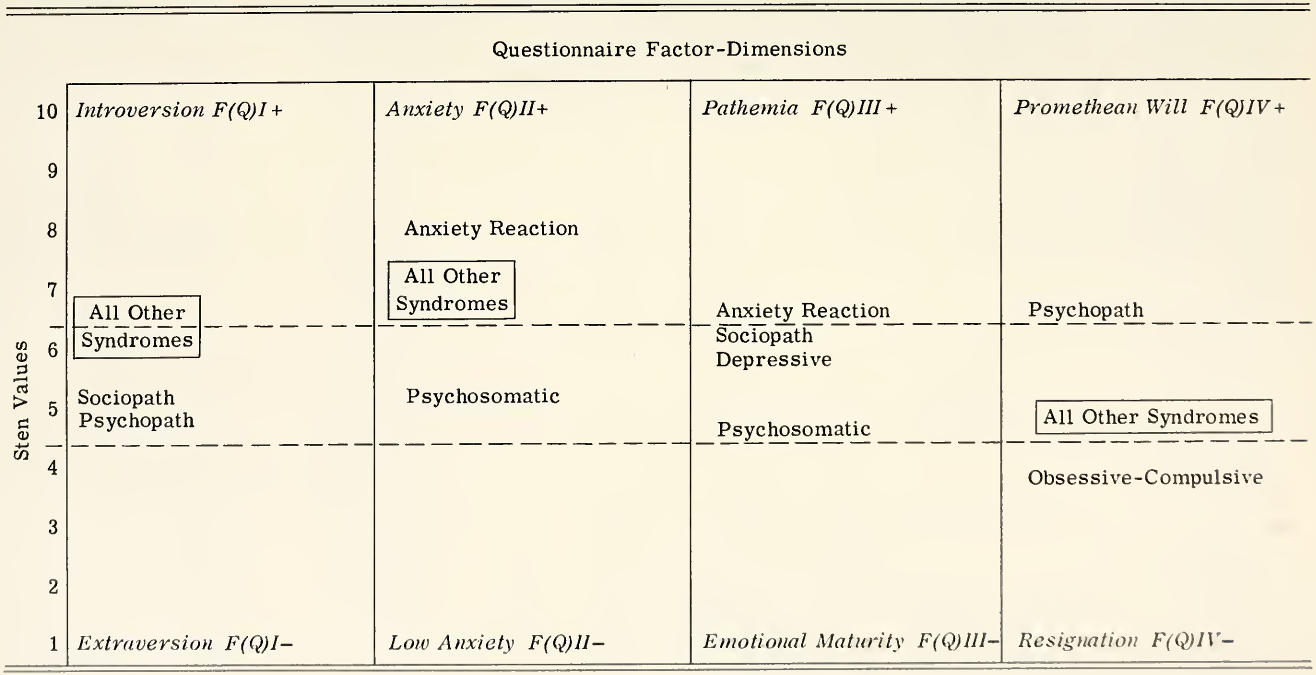
Sten Values*	*Cyclothymia (A+)*	*Ego Strength (C+)*	*Dominance (E+)*	*Surgency (F+)*	*Superego Strength (G+)*	*Parmia (H+)*
10						
9						
8			Psychopath			
7	Sociopath Psychopath					
6	Depressive		Psychosomatic	Psychopath Sociopath		
5	Conversion Reaction	Psychosomatic Obsessive			Depressive Reaction Conversion Reaction	Psychosomatic Psychopath
4	Psychosomatic					
3		Sociopath Anxiety Reaction Depressive	Anxiety Reaction Obsessive	Depressive	Psychopath	Obsessive
2						
1	*Schizothymia (A–)*	*Ego Weakness (C–)*	*Submissiveness (E–)*	*Desurgency (F–)*	*Lack of Conscience (G–)*	*Threctia (H–)*

*The two horizontal lines in the middle of each column represent the normal range, in which 40 to 50 per cent of the general population falls.

DIAGRAM 7-1 (cont.)

Sten Values	Questionnaire Factor-Dimensions					
10	*Tender-Mindedness (I+)*	*Suspiciousness (L+)*	*Autistic Non-Conformity (M+)*	*More Guilt-Proneness (O+)*	*Self-Sentiment (Q_3+)*	*Ergic Tension (Q_4+)*
9				Anxiety Reaction		Conversion Reaction
8				All Other Syndromes		Psychopath
7	Anxiety Reaction Depressive	Anxiety Reaction Depressive Psychopath	Depressive Psychopath			All Other Syndromes
6	Obsessive				Psychosomatic	
5		Obsessive Psychosomatic	Conversion Reaction Psychosomatic Sociopath	Psychosomatic		Psychosomatic
4	Psychosomatic				Psychopath	
3					Sociopath	
2						
1	*Tough-Mindedness (I–)*	*Trustfulness (L–)*	*Practicality, Conformity (M–)*	*Confidence (O–)*	*Lack of Self-Sentiment (Q_3 -)*	*Relaxation (Q_4 –)*

DIAGRAM 7-1 (concluded)


Questionnaire Factor-Dimensions
Sten Values
10
9
8
7
6
5
4
3
2
1
Introversion F(Q)I +
All Other Syndromes
Sociopath
Psychopath
Extraversion F(Q)I–
Anxiety F(Q)II+
Anxiety Reaction
All Other Syndromes
Psychosomatic
Low Anxiety F(Q)II–
Pathemia F(Q)III +
Anxiety Reaction
Sociopath
Depressive
Psychosomatic
Emotional Maturity F(Q)III–
Promethean Will F(Q)IV +
Psychopath
All Other Syndromes
Obsessive-Compulsive
Resignation F(Q)IV–

TA

Questionnaire Factor Sten Profile

		Questionnaire Factor Sten						
Syndrome Groups	Number in Group	Cyclothymia A	Intelligence B	Ego Strength C	Dominance E	Surgency F	Superego Strength G	Parmia H
Anxiety Reaction (40.0)*	78	5.9	4.9	2.9	3.7	3.6	4.3	4.
Depressive Reaction (40.5)*	20	6.4	4.2	2.7	4.1	3.4	5.6	4.
Conversion Reaction or Conversion Hysteria (40.2)*	11	5.0	6.0	4.0	5.5	4.2	5.5	4.
Obsessive-Compulsive Reaction (40.4)*	11	5.7	5.2	5.2	3.1	3.7	4.5	3.
Psychosomatic Disorder or Somatization Symptoms	14	4.6	5.9	5.4	5.8	4.4	4.9	5.
Psychopaths	17	6.7	5.0	4.3	8.2	6.4	3.1	5.
Sociopaths (with neurotic trends)	28	7.1	no data	3.0	4.9	5.4	4.8	4.
Total	179							

*Identification numbers of syndrome groups are according to the Amer
Psychiatric Association's Classification Manual (5).
A profile for 33 male homosexuals is also available (see footnote 3, p.

drome groups and second, syndrome by syndrome, in terms of the particular set of dimensions most crucially characterizing each syndrome.

THE MANNER IN WHICH EACH QUESTIONNAIRE DIMENSION DISCRIMINATES BETWEEN SYNDROME GROUPS. Diagram 7–1 is a graphic visual summary of the numerical data in Table 7–1. This diagram places, at their approximate sten value, the syndrome groups which are highest and lowest on each of the sixteen most significantly differentiating dimensions. The relation of each group to the normal range is also shown by the syndrome's position relative to the horizontal lines en Clinically Placed Syndrome Groupings

r Titles at Positive Pole)

Non-Conformity	Shrewdness	Guilt Proneness	Liberalism	Self-Sufficiency	Self-Sentiment	Ergic Tension	Invia or Introversion	Anxiety	Pathemia *vs.* Cortical Alertness	Promethean Will *vs.* Resignation
M	N	O	Q_1	Q_2	Q_3	Q_4	F(Q)I	F(Q)II	F(Q)III	F(Q)IV
6.4	5.2	8.5	5.4	6.1	4.5	7.8	6.4	7.7	6.5	4.6
7.2	5.6	7.8	4.6	6.4	5.2	7.5	6.5	7.3	6.3	4.6
5.1	5.9	7.4	4.6	5.7	4.7	8.4	6.2	7.1	5.4	5.2
5.5	4.5	7.8	4.3	5.1	5.0	7.6	6.4	6.6	6.2	3.9
5.1	5.6	5.2	4.4	6.6	5.9	5.3	6.1	5.2	4.7	5.1
6.7	6.0	6.7	5.5	5.2	4.4	8.1	5.1	7.0	5.9	6.5
5.0	4.6	6.8	4.7	5.0	3.4	6.5	5.4	7.1	6.5	4.8

not dealt with here since it was based only on Australians and was very
tly received. Other very recently received profile data of clinical in-
t will be found in reference 122a.

enclosing this range. Sten value differences of from one to two full points are statistically significant, depending on the size of the groups compared.

Each of the vertical columns in Diagram 7–1 can be read as a statement about modification of neurosis expression (as psychiatrically evaluated) by the stipulated questionnaire factors. Thus, high factor A tends to eventuate in depressive manifestations of neurosis, while a neurotic with low factor A is predisposed to Conversion Reaction or Psychosomatic Disorder expression of his neurotic tendencies. Similarly, the maladjusted person who is Submissive (E−) tends to express this maladjustment as Anxiety Reaction or in Obsessive-Compulsive behaviors, but as he is more Dominant (E+) the probabilities are that pathology will be expressed as Psychosomatic Disorder or Psychopathic behavior. Again, the person with high frustration-tension (Q_4+) is more likely to express his pathology as Conversion Reaction, while the person with less tension is more prone to psychosomatic manifestations. The columns of Diagram 7–1 summarize what amounts to a series of statements as above, and each dimension therefore need not be recapitulated here.

The most striking general impression one gets from Diagram 7–1 is the number of distinct dimensions which significantly discriminate between two or more of the syndrome groups. Once again we are faced with the necessity of multidimensional analysis, for no single dimension can account for all the differences between one syndrome group and another, although it should be noted that the dimensions of Dominance, E+; Tender-Mindedness, I+; Anxiety, F(Q)II, and Promethean Will, F(Q)IV+, stand out somewhat in discriminatory power.

DISCUSSION ORGANIZED IN TERMS OF SYNDROME GROUPS RATHER THAN DIMENSIONS. *The empirically defined relations between syndromes.* The profile information in Table 7–1 and Diagram 7–1 can be organized in terms of syndrome groups rather than in terms of statistically defined dimensions. A natural first question is: What are the relations between the seven syndrome groups, in terms of their psychometrically measured dimensional profiles? A precise answer to this question is provided in Table 7–2, which gives pattern similarity (r_p) coefficients between all possible pairings of syndrome groups. This coefficient gives an exact figure describing the degree of shape and level similarity between two syndrome factor-profiles.

The first point is obvious but important. It is that the syndrome groups are substantially related and far from mutually exclusive as categories. The average intercorrelation of the syndrome patterns is approximately +.60, which is highly significant statistically and means that much of the information in one syndrome duplicates information in other syndromes. That is, to take an extreme case ($r_p = +.88$), persons placed clinically as Depressive have so much in common with persons placed clinically as Anxiety Reaction that use of two distinct words and concepts seems almost pointless in terms of the information conveyed. The above statement must be qualified immediately by adding that, in the wider realms of measurement available to objective testing, Depressive and Anxiety Reactions may separate more sharply. The only point demonstrated here is that there is some substantial overlap of information in such syndrome catagories, with consequent wastage

TABLE 7–2

PATTERN SIMILARITY (r_p) COEFFICIENTS SHOWING THE DEGREE OF SIMILARITY BETWEEN THE QUESTIONNAIRE-DIMENSION PROFILES OF SEVEN SYNDROME GROUPS *

(All Values Are Positive)

	Depressive Reaction	Conversion Reaction	Obsessive-Compulsive Reaction	Psychosomatic Disorder	Psychopaths	Sociopaths
Anxiety Reaction	.88	.73	.74	.38	.51	.69
Depressive Reaction		.73	.71	.44	.50	.68
Conversion Reaction			.75	.64	.62	.75
Obsessive-Compulsive Reaction				.53	.43	.70
Psychosomatic Disorder					.48	.56
Psychopaths						.61

*In computing these r_p's, second-order sten values were not considered, since these are a direct function of first-order values.

and duplication of information. It would be more efficient to classify patients in terms of essentially independent dimensions, so that different semantic-conceptual categories would actually refer to mutually exclusive bits of information. This is, in fact, what factor-profile systems can do in describing patients.

Although all syndromes are substantially related to one another, the degree of relationship varies. Anxiety Reactions, Depressives, Obsessives, and Conversion Reactions correlate more highly with one another (average $r_p = .76$) than they do with the three other syndrome groups (average $r_p = .57$). Moreover, all four of these syndromes, but especially the first two, show marked general resemblance to the profile for neurotics of all types (Table 4–2);[3] hence, they can be identified as the neurotic cluster of syndromes. Sociopaths are next most closely related to this neurotic cluster (average $r_p = .70$), probably because these were sociopaths specially chosen for prominence of neurotic trends (twenty-five of our sample of twenty-eight were also the sociopathic neurotics of the R10 study in Chapter 5).[4] Psychopaths and Psychosomatics are least related to the neurotic cluster (average $r_p = .50$) and also relatively independent of one another ($r_p = .48$). The lowest relationship in Table 7–2 is between Anxiety Reaction and Psychosomatic Disorder ($r_p = .38$), suggesting some polarity between free and bound anxiety. The above data constitute a dramatic confirmation of the clinical judgment expressed in the American Psychiatric Association's Diagnostic Manual (5), for there we find that, consistent with our data, Anxiety Reactions, Depressives, Conversion Reactions, and Obsessive Compulsives are grouped together as neurotic, and sharply distinguished from other syndromes such as Psychopath, Sociopath, and Psychosomatic Disorder.[5]

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[3] Stated differently, this means that the factors which distinguish normals from general neurotics are by and large the same factors which distinguish normals from each of the four neurotic syndrome groups. That is, *general* neurotic-contributory dimensions (Chap. 6) will for the most part also suffice as *syndrome* neurotic-contributory dimensions.

It remains to note that as for level, Anxiety Reactions tend to be simply more severely neurotic (higher score on all neurotic-contributories) than Depressives, and Depressives similarly higher than Conversion Reactions. However, this should not be taken as a firm conclusion, for there are represented here (in their questionnaire counterparts) only U.I. 24 and U.I. 22— of the neurotic process factors (see Chap. 5) and we do not know what the levels would have been on U.I. 23—, 16—, and 29— had these measurements been available as profile points.

Description of each syndrome. Diagram 7–2 is a useful graphic way of illustrating the position of each syndrome on the major questionnaire dimensions relative to other syndromes. Syndrome groups are located in terms of their position on all possible pairs of second-order questionnaire-dimensions (Introversion, Anxiety, Pathemia, and Promethean Will). Second-order dimensions were used as the most concise way of capturing most of the information in first-order dimensions. The points made below may be followed in terms of any of the three alternative presentations of the data (Table 7–1, Diagrams 7–1 and 7–2).

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[4] Lykken's data on this point (146) are interesting, although also based on a relatively small sample. He found that "neurotic" sociopaths were higher than normals in anxiety, as measured by the Taylor Scale (212) and other tests, while "primary" (other than neurotic) sociopaths were significantly *lower* than normals on anxiety. Since the Taylor Scale is a good measure of Anxiety, as shown in F(Q)II (Table 4–6), these data are relevant here and show that the overall sociopath category, if not broken down further, can contain quite different types of persons.

[5] This is the second major confirmation of clinical judgment we have come upon in our data, the first being the striking similarity in the questionnaire-dimension profiles of neurotics (all syndromes together) drawn from ten different institutional centers (diagnosed as neurotic by ten different clinicians or teams of clinicians). See Chap. 4.

Syndrome by syndrome, the salient conclusions are as follows:

Anxiety Reactions, as one would expect, are characterized primarily by a high level of free, conscious anxiety—F(Q)II—with, particularly, the low Ego Strength (C—), Guilt Proneness (O+), and Suspiciousness (L+) components. However, Anxiety Reactions tend to be toward the neurotic on every one of the neurotic-contributory dimensions; that is, on Pathemia, Resignation, and Introversion, as well as Anxiety. Other notable characteristics are Tender-Mindedness (I+) and Submissiveness (E—).

Depressive Reactions closely parallel Anxiety Reactions on all dimensions, but typically show less deviation from normalcy and towards neurotic-contributory poles. Depressives are slightly more Introverted than Conversion Reactions and Psychosomatics (as clinical theory would suggest), particularly in terms of the Desurgent depression component of Introversion (F—). Relative to other syndrome groups, some notable first-order characteristics are higher Superego Strength with lower Ego Strength (G+, C—) and, somewhat surprisingly, higher Autistic Non-Conformity (M+).

Conversion Reactions tend generally to be near the center of the neurotic syndromes' profile, deviating from them markedly only on the Pathemia dimension, where Conversion Reactions tend to group with Psychosomatic Disorder at the Cortical Alertness pole (all other syndromes are towards the Pathemia pole). In terms of first-order dimensions, Conversion Reactions have a very high level of frustration-tension (Q_4+), higher than any other syndrome, and are also relatively high on Superego Strength (G+).

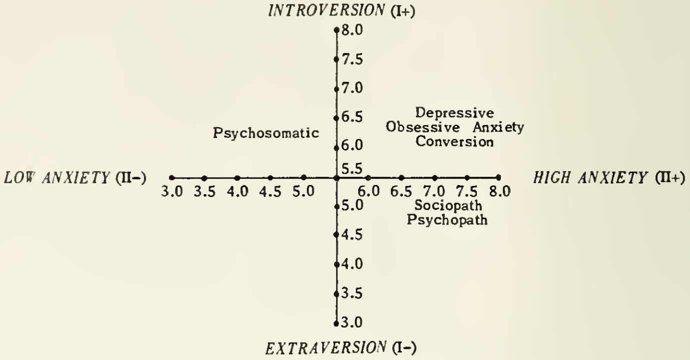
Obsessive Compulsives are differentiated from other neurotic symptom groups by a lowered Anxiety level, but especially by more Resignation. Generally, they show a vulnerability to social pressure in Submissiveness (E—), Threctia or Threat Susceptibility (H—), lack of self-sufficiency (Q_2-), naiveté (N—) and trustfulness (L—).

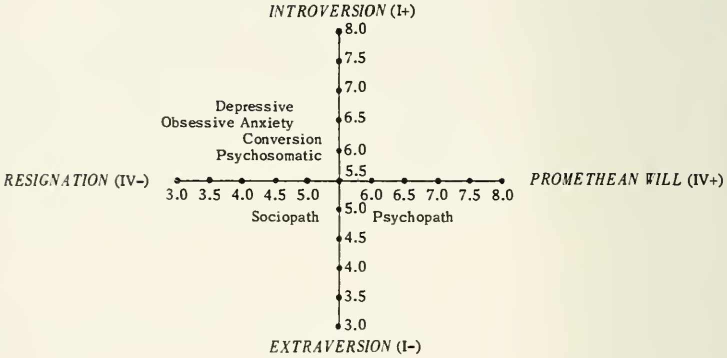
Psychosomatics are psychologically the toughest (I—), the male-associated pole of this factor. They do not think in emotional terms as much as the other syndrome groups do, e.g., F(Q)III, and show far less expression of free, conscious Anxiety. If additional groups confirm our rather limited Psychosomatic Disorder sample findings, then the opposition of this syndrome to Anxiety Hysteria in Anxiety and Pathemia may lead to a new understanding. The condition of Corticalertia in Psychosomatics, with its tendency to handle the environment in alert, cognitive terms rather than by a drift of emotional experience, would naturally tend to a higher activity level and an attempt to solve problems by external action. This is aided by the Psychosomatic's slight tendency towards Extraversion (as compared to the

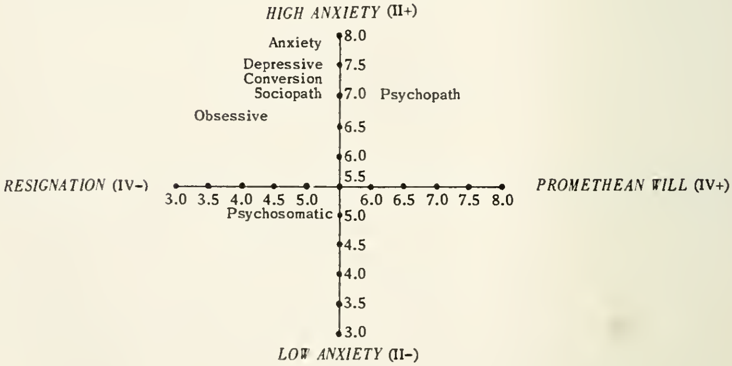
DIAGRA

Syndromes Placed in Relation to All Possible Pairi

(Introversion, Anxi







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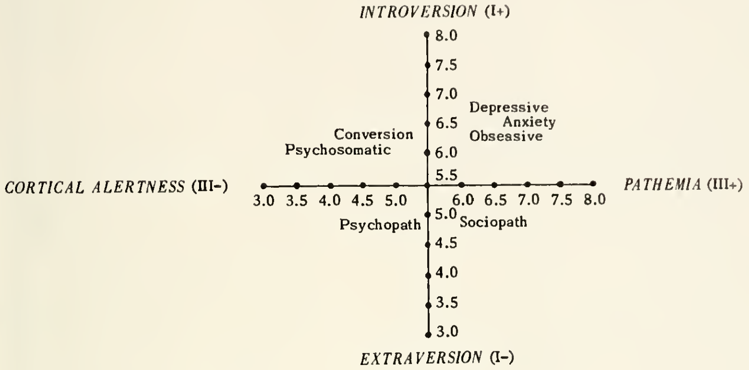
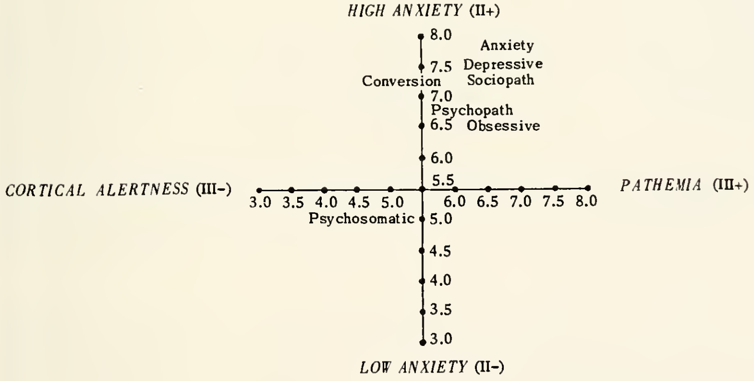
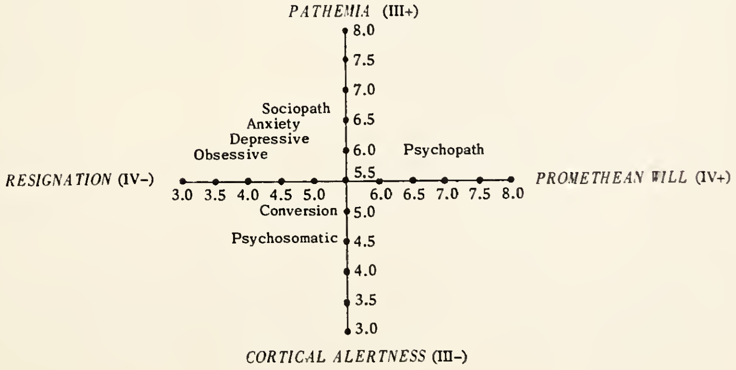
THE SECOND-ORDER QUESTIONNAIRE DIMENSIONS

themia, and Promethean Will)







other neurotic syndrome groups). Consequently, we may see his lower Anxiety level as resulting from a tendency to solve the neurotic problem, existing at some deeper level, in terms of greater activity and exclusion of feeling. Our hypothesis would therefore be that psychosomatic symptoms, unlike those of Conversion Reaction, are true wear-and-tear at the physiological level, occasioned by this attempt to discharge anxiety and other emotion in high cortical alertness and activity.

Psychopaths separate sharply from the other neurotic syndrome groups on all the second-order dimensions except Anxiety, but especially by virtue of having much higher Promethean Will and Extraversion. Psychopaths, as contrasted with Obsessives, show invulnerability to social pressure (H+, E+, N+, etc.), being particularly high on Dominance. Recently, we have come to suspect that this Dominance dimension (E) involves a considerable amount of hostility towards society, an interpretation which fits its outstandingly high value in the psychopathic group. As might be expected, Psychopaths are low on Superego Strength (G−) and high in Autistic Non-Conforming tendency (M+).

Sociopaths tend to group with the neurotic syndromes in having high Anxiety, Pathemia, and Religious Resignation, but they group with Psychopaths in being more Extraverted than are the neurotic syndromes. Their similarity to the neurotic syndrome may be due to the fact that our particular sociopathic group was deliberately chosen so as to maximize the presence of neurotic trends; therefore, crystallization of conclusions about sociopaths is especially dangerous on the basis of our present data.

Conclusion

The exploratory research in this chapter has succeeded in showing that traditional clinical syndromes can be described and differentiated significantly in terms of their questionnaire-dimension profiles. The profiles for each syndrome group generally support meaningful interpretations in terms of the clinical lore associated with these syndromes, but there are some surprises which we hope will eventually lead to new insights and fruitful research.

Obviously, the definition of questionnaire measures is developing to the point where we can soon expect a clinical diagnostic system in terms of continuous variability on factor measures rather than all-or-none assignment to a clinical syndrome category. The clinician will use the pattern similarity coefficient (r_p) or other similar devices[6] to compare the individual patient's profile with the standard syndrome-norm profiles (as in Table 7–1) and thus be able to specify the exact degree to which a given patient belongs to one or the other of the syndrome groups. For example, instead of having to say, simply and roughly, that patient X is an Obsessive-Compulsive with some Depressive trends, we can say precisely: patient X is Obsessive-Compulsive to the extent of an r_p of +.78 between his profile and the standard obsessive-compulsive profile, fits the Depressive Reaction category to the extent of a +.58 r_p between his profile and the standard Depressive Reaction profile, and so on, for example, Anxiety Reaction ($r_p = .43$), psychopathic trends ($r_p = .30$), etc. What is more, all clinicians will agree exactly on this diagnosis in so far as it is based on test devices scored in a standard manner.

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[6] A discussion of the above and other possible devices will be found on p. 403.

The above system has value in permitting us to interlock precisely with the considerable body of measurable information already available clinically on syndrome groups. Yet, eventually, we would hope that the syndrome model could be sharpened or supplanted by a system using profiles on genuinely functionally distinct factor-dimensions, no one of which seriously duplicates the information in any other and each of which has functionally distinct implications for prognosis and therapy. As our data showed, these information-efficiency ideals are not satisfactorily met in the overlapping categories of the syndrome system.

Summary

1. The same total severity of neurosis or anxiety will be expressed in various ways by various patients, requiring specially appropriate diagnoses, prognoses, and therapies.
2. Such individual expressions of neurosis or anxiety can be handled precisely in the factor analytic framework by noting the proportion of contribution from each of the components in the total neurosis or anxiety score.
3. Direct type definition shows distinct questionnaire factor-profiles for seven clinically segregated syndrome groups. The discussion relates the new factor-profile conception to clinical syndrome conceptions and indicates the potentiality of the former for continuous (*vs.* all-or-none) syndrome classification.

CHAPTER 8

THE DETERMINATION OF INDIVIDUAL DIFFERENCES IN THE EXPRESSION OF NEUROSIS AND ANXIETY: SYSTEMATIC INFLUENCES FROM OTHER FACTORS AS ONE MECHANISM

Relations Between Test Variables and Factors as Carriers of Information

Thus far our definition of neurosis and anxiety has been based on sets of factors whose scores differentiate significantly between normals and anxious or neurotic persons. The factor score, not the test score, has been the unit of measurement on the premise that, as such, it is more stable than test scores. For this reason, the clinical concepts of neurosis and anxiety were related to factors, not tests (Chaps. 3–6), and we fixed our attention on total factor score which remained constant in spite of different proportions of contribution from associated variables (Chap. 7). For example, we agreed that score on F(Q)II Free Anxiety could be contributed to in different persons by various combinations of scores on the component variables of Guilt Proneness, Ego Strength, Suspiciousness, etc.

A factor is a more stable unit of measurement than any of its loaded test variables essentially because a single variable's score will be distorted by random or systematic specific influences not directly related to the total factor score, while in a total score based on several variables these distortions will tend to be cancelled out by random and systematic influences affecting another variable's score in a counterweighting direction. Very little will be said here about random influences such as experimental error of measurement. We note only that they are more likely to be suppressed as we increase the number of variables on which score is based or the reliability of measurement of any given variable.

Although factor scores are more stable than test scores, we must nevertheless recognize their dependence on the individual variables which load them, for a person's factor score is computed as a combination of his scores on a set of individual variables, weighted according to their loadings on the factor. The unanalyzed total factor score therefore misses some information, for it can remain the same, even though there is variation in the pattern of values on the contributing component variables. Thus, Guilt Proneness (O+) added to low Suspiciousness (L−) can produce the same total level of Anxiety as does low Guilt Proneness added to high Suspiciousness. Simply citing the total Anxiety score misses the important differences which may exist in shape of contributing profile, with all its diagnostic and prognostic implications. Therefore, it is worth while to shift level of analysis one step down—from determination of total factor score by component variables, to determination of score on each component variable—in order to explain why different profiles occur on component variables contributing to the same total factor score. That is, in now dropping to the level of the *individual variable,* and mechanisms determining its score, we hope to explain one mechanism by which differences in profile form (Chapter 7) are produced, even though total factor score remains constant.

Multiple-Source Determination of Score on Any One Variable

Increased understanding of the nature and measurement of factors will eventually produce tests which can be deliberately constructed to load only one factor highly and significantly. However, at present this ideal has not been attained and our discussion therefore starts with the basic fact that no known variable—and we have tried hundreds of them—loads significantly on only one factor. Our position has always been that factors can be considered as representing sources or influences in the personality (44, pp. 301 ff.; 29, pp. 78 ff.). Hence, the above fact can be stated equivalently as follows: Score on any single test variable is contributed to by more than one systematic influence (factor) in the personality. This means that score value on each profile point (or variable) is contributed to by influences outside the particular factor in terms of which this profile point is being analyzed.[1]

The above is not simply a peculiarity of factor analytic method; rather, it is a more precise way of formulating a wisdom long in common speech. There, it is readily understood that a given piece of behavior can be due to several determining factors, as when we say a person dislikes such-and-such a job not only because he finds he is poor at it, but also because he temperamentally dislikes dealing with people, thinks he is underpaid, etc. In factor analysis, this breakdown is quantitatively expressed by the specification equation which in a particular case might take the values: fluency (words per minute) $= .3F_1 + .5F_2$

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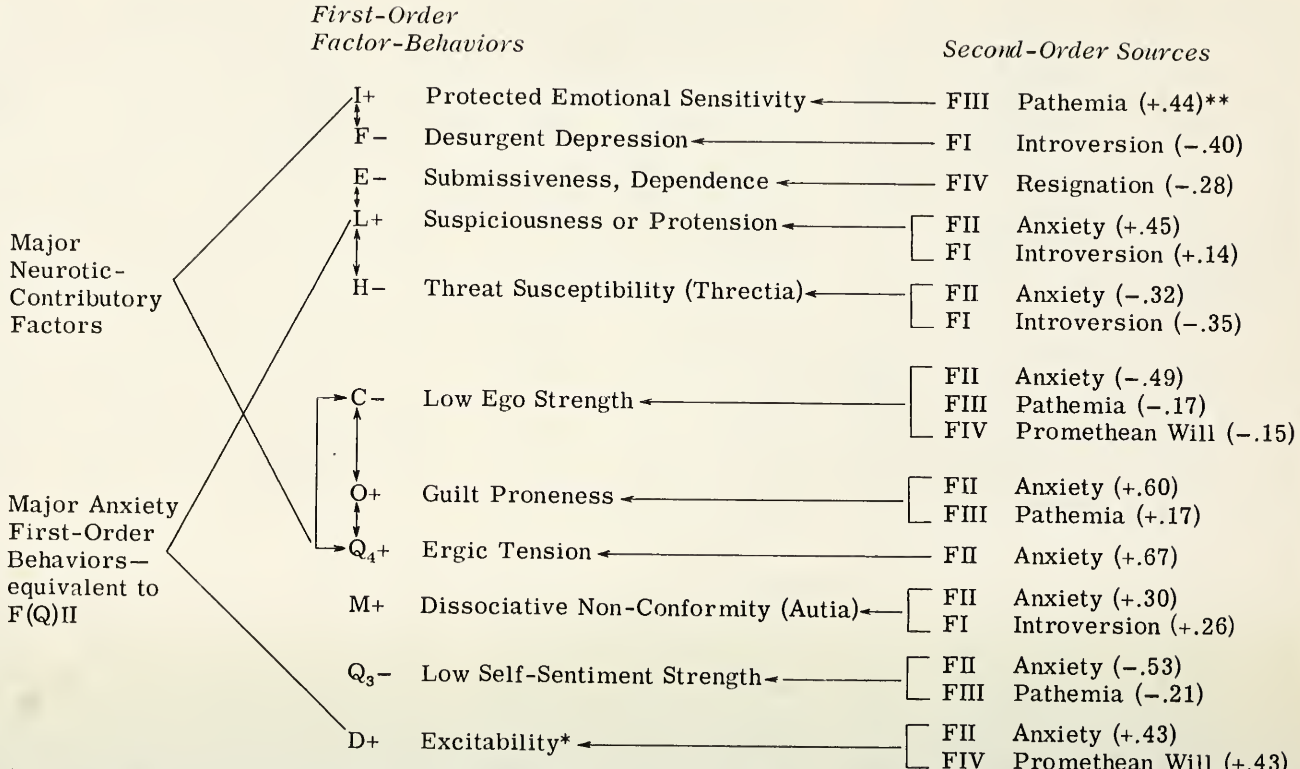
[1] We are not proposing that all profile form variation is thus caused by systematic influences from other factors. It is likely that at least some profile-variation is determined by a separate biological or other influence governing the expression of one factor only. Chap. 10 may provide us with some insights into what these biological sources might be.

DIAGRAM 8-1

Multiple-Source Determination of Factor Analytically Defined Neuroticism and Anxiety Behaviors in the Questionnaire-Rating Realm


First-Order Factor-Behaviors
Second-Order Sources
Major Neurotic-Contributory Factors
Major Anxiety First-Order Behaviors—equivalent to F(Q)II
I+ Protected Emotional Sensitivity — FIII Pathemia (+.44)**
F− Desurgent Depression — FI Introversion (−.40)
E− Submissiveness, Dependence — FIV Resignation (−.28)
L+ Suspiciousness or Protension — FII Anxiety (+.45); FI Introversion (+.14)
H− Threat Susceptibility (Threctia) — FII Anxiety (−.32); FI Introversion (−.35)
C− Low Ego Strength — FII Anxiety (−.49); FIII Pathemia (−.17); FIV Promethean Will (−.15)
O+ Guilt Proneness — FII Anxiety (+.60); FIII Pathemia (+.17)
Q₄+ Ergic Tension — FII Anxiety (+.67)
M+ Dissociative Non-Conformity (Autia) — FII Anxiety (+.30); FI Introversion (+.26)
Q₃− Low Self-Sentiment Strength — FII Anxiety (−.53); FIII Pathemia (−.21)
D+ Excitability* — FII Anxiety (+.43); FIV Promethean Will (+.43)

*D+ has never been tested to determine whether or not it is neurotic-contributory, but it is known to load the Anxiety factor in studies with children (see Table 4-3).

**Figures in parentheses give the actual loading (average) of the first-order on the second-order (see Table 4-3), and hence an estimate of the degree to which the second-order

$- .2F_4$, etc. This says that fluency is contributed to by high general intelligence (F_1), temperamental exuberance (F_2), low inhibition (F_4), etc., the variance proportions being, for the average person, the squares of the coefficients which weight each of the factors and which are determined by the process of factor analysis.

Multiple Sources Determining Variations in the Expression of Neurosis and Anxiety

Questionnaire and rating evidence. Thus far we have noted that persons with the same total factor score can still have different profiles on the component variables loading that factor. Since profile-shape by itself may have important implications for diagnosis and therapy, it is necessary to understand what governs values on the individual variables making up the profile points. One possible mechanism proposed is that several factor-influences in the individual's personality may help to determine the score on a variable loading a given factor and providing a profile point.

Following our usual procedure, the above mechanism will be analyzed first in terms of questionnaire and rating evidence and then in terms of objective test evidence. Now, variations in neuroticism-expression can be most succinctly described by means of the eight first-order questionnaire factors discussed in Chapters 4, 6, and 7. These, understood here as points in the neurosis-expression profile, are bracketed at the top of the left-hand column of Diagram 8–1. The diagram reveals how second-order influences affect and change the pattern (profile) of first-order neurotic expression, telling us what second-order sources to suspect if a given first-order expression of neurosis is especially prominent or lacking. Thus, reading from left to right in Diagram 8–1, we can pinpoint the second-order influence (or influences) governing level on each component in the neurotic-contributory factor profile; for example, C level is determined jointly by FII, FIII, and FIV; Q_4 level is determined mainly by FII, etc. All four second-order *Q* factors influence levels on at least one of the components in the neurotic-contributory set. In order of strength of effect we find F(Q)II, Anxiety, acts to increase Ergic Tension (Q_4+), Guilt Proneness (O+), low Ego Strength (C−), Suspiciousness (L+) and Threat Suspectibility (H−); F(Q)I, Introversion, enhances Desurgent Depression (F−), Autia (M+), Threat Suspectibility (H−), and Suspiciousness (L+); and F(Q)III, Pathemia or Emotional Immaturity, accentuates Protected Emotional Sensitivity (I+), Guilt Proneness (O+) and low Ego Strength (C−) as neuroticism expressions. Since each of these second-orders is itself a neurotic-contributory factor, it is not surprising to find that each acts consistently to augment certain first-order expressions of neuroticism. Among the second-order factors, only F(Q)IV fails to appreciably and consistently enhance first-order neurotic expressions. At its neurotic-associated Resignation pole, it increases Submissiveness (E—), but tends to raise Ego Strength, pushing it away from the C— or neurotic pole.

The vertical arrows in Diagram 8–1 connect first-order factors which tend to have a number of *items* loading in common. In more technical terms, this possession of common variables in the loading pattern is called "cooperation" between factors (see 35, pp. 285 ff.). It is interesting to note that this cooperation occurs only among neurotic-contributory factors with no other factors showing experimental evidence of cooperating with the neurotic-contributory set.[2] Cooperation among first-order neurotic-contributories has very little interest for us, at any rate, since we will not be dealing with pattern of neuroticism expression in terms of profiles of item scores on a first-order factor, but rather with profiles of first-order factor scores in the neurotic-contributory set. On the other hand, a test designed to measure total level of neuroticism with a minimum number of items can make use of the fact that certain items at the same time load both factors I and F, E and L, or C, O, and Q_4, in the neuroticism-contributory direction.

In summary of questionnaire evidence on neurosis, shape of profile on the neurotic-contributory, first-order dimensions is determined primarily by the neurotic-contributories themselves (either first– or second-order). That is to say, variation in mode of expressing neurosis (profile shape) is determined by the same factor-sources which distinguish neurotics in general from normals.[3] This does not mean that such internal-to-neuroticism determination of neurotic expression is restricted in scope. All four major second-order factors influence neuroticism expression at the first-order level, one of them heavily and two of them substantially. Moreover, if we add to our list of neurotic-contributory factors, M+ and Q_3−, which approach significance in this respect, no less than ten first-order questionnaire factors are neurotic-contributory factors. In other words, for neuroticism, both definition and determination of mode of expression are very broadly based, in-involving a large portion of the known realm of questionnaire-measurable personality.

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[2] This absence of common-loading items could conceivably be due to the fact that such items have not yet been discovered, for in several cases it is hard to discount the possibility of some underlying relationship to the quality, course, or duration of anxiety. Thus, for example, A+, Cyclothymia, might lead to more overt, fluctuant, moody expression of neurosis or anxiety, and G+, Superego, might express it more in moral issues, etc. Future research with skillfully designed questionnaire items is likely to provide the answers to such questions. See also Chap. 7, Diagram 7–1 and discussion, for evidence that some dimensions which are not themselves neurotic-contributory nevertheless help to determine the manner in which an already existing neurosis is expressed.

[3] The results in Chap. 7 warranted the same conclusion. There, the factors which most importantly discriminated between different clinically judged syndrome groups (modes of neurosis expression) tended also to be the factors most crucial in distinguishing normals from neurotics of all types mixed together. The present chapter differs from Chap. 7 in postulating that variation in expression of neurosis can occur continuously in terms of profile on the eight first-order neurotic-contributories and need not be frozen in terms of a relatively limited set of discrete, clinical syndrome categories.

In Diagram 8–1, anxiety components are represented by the eight factors bracketed at the bottom of the left-hand column. For purposes of this discussion, variation in mode of expressing anxiety is represented by variation in shape of profile on these eight factors. As Chapter 4 showed, general free anxiety is best identified as a single second-order factor, F(Q)II, loaded by all of the above eight anxiety-components. To indicate this, each of the eight first-order anxiety components in Diagram 8–1 is shown as being affected by F(Q)II as a second-order influence. All three of the other main second-order *Q* factors also have some effects on the expression of anxiety in terms of its eight component first-orders. F(Q)I, Introversion, accentuates Threat Susceptibility (H−), Autia (M+), and Suspiciousness (L+); F(Q)III, Emotional Immaturity or Pathemia, slightly enhances the anxiety expressions of low Self-Sentiment Strength (Q_3−), Guilt Proneness (O+), and low Ego Strength (C−); and F(Q)IV, Promethean Will, acts to increase Excitability (D+) and decrease Ego Strength (C−). This last relationship is one more proof of the distinctness of neuroticism and anxiety, for F(Q)IV−, Resignation, tends to be neurotic-contributory, while F(Q)IV+, Promethean Will, tends slightly to augment expressions of anxiety. It would seem that the direction of a person's endowment on F(Q)IV helps to determine whether pathology will be expressed as neuroticism, especially Submissiveness, or alternatively, as free anxiety, especially Excitability.

Just as with neuroticism, we can read from left to right in Diagram 8–1 to determine which second-order influences act on any given first-order expression of anxiety to change the shape of the anxiety-expression profile. However, unlike the case of neuroticism, where second-order influences on expression were themselves neurotic-contributory factors, the three second-order influences on Anxiety expression are not themselves anxiety factors. Thus (a) as they act together at their F(Q)I+, F(Q)III+ and F(Q)IV+ poles, they would tend to produce a spuriously high estimate of F(Q)II total anxiety level (from component F(Q)II variables); but (b) as they act in opposition to one another (F(Q)I+ with F(Q)III−, F(Q)IV− with F(Q)III+, etc.), they will tend to change the pattern of anxiety expression without spuriously affecting anxiety level. In either case, the moral is to measure the entire personality, in order to partial out spurious total anxiety level effects (as in (a) above) or to determine the exact source and nature of second-order influences modifying anxiety expression (as in (b) above).

As contrasted with neuroticism, anxiety is less broadly defined and affected in expression, that is, the effects on mode of expression by second-order influences are relatively less pronounced. This would be even more striking if we had omitted from our calculation's first-order factors H— and M+, which are not highly loaded on the Anxiety factor.

Objective test evidence. As noted in Chapter 6, neuroticism and anxiety in objective tests are most efficiently and completely described at the first-order factor level in terms of U.I. 22—, 23—, 24+, 29—, etc. The same was true of the questionnaire and rating realm, with first-order factors Q_4+, E—, C—, O+, F—, etc., being the preferred descriptive system. However, there will be important differences in our manner of handling the objective test system in terms of individual behavior expressions in anxiety. Individual differences in the expressions of a given first-order questionnaire factor can only occur in terms of profiles on the items loading that factor. Since scores for individual items are relatively unreliable, we choose to emphasize first-order *factor-scores* as the units for describing questionnaire expressions of anxiety or neuroticism. However, when we come to first-order factors for objective tests, the components loading the factor are relatively reliable tests, not items, and it therefore is feasible to use such tests by themselves as points in the profile of neuroticism or anxiety expression. This system is logical as well as feasible, for first-order objective test factors tend to be at a second-order level relative to first-order *Q* and *L* factors. That is, first-order *Q factors* load right along with objective tests (at the same factor-order level) on first-order objective test factors. Therefore, use of objective tests as units for profile expression of neuroticism and anxiety is consistent with our treatment of questionnaire evidence in the previous section.

The main difficulty with this system is the large number of individual test behaviors it makes possible as carriers of individual differences in the expression of neurosis. This is not so much a problem for U.I. 24 Anxiety, since there are only about ten consistently and highly loaded tests to provide points in the anxiety-expression profile. But complete description of neurosis requires U.I. 24 as well as at least eight or nine other first-order objective-test factors, each of which is significantly loaded by about ten test behaviors. Of these some one hundred tests, almost one-half load significantly on more than one of the neurotic-contributory first-orders; hence, the number of different neurotic-contributory tests is about fifty-five to sixty. This is still an unmanageably large number to deal with as points in a neurotic-expression profile. Every known objective-test factor-source, neurotic-contributory or not, would influence score on at least one or two of these fifty-five or sixty test variables, which again reminds us that complete understanding of neurosis expression requires measurement and understanding of the total personality.

Obviously, some simplification is necessary in the present exploratory and illustrative treatment, and it is best achieved by restricting consideration to a smaller number of more essential neurotic-contributory factors. Accordingly, we have chosen to deal only with four of the neurotic process factors—those which most significantly and meaningfully differentiate between clinically-judged neurotics and normals (see Chaps. 5 and 6). These neurotic process factors are: U.I. 24+, the factor of overall, Free Anxiety; U.I. 22—, Pathemia; U.I. 23—, Neurotic Regressive Debility; and U.I. 29—, low Adaptation Energy.[4] These four factors overlap somewhat in loaded behaviors and hence involve only about twenty-five different test behaviors. Table 8–1 lists the ten of these which are most affected by other-than-neurotic process factors in the first-order realm—most affected both in terms of number of other factors influencing a behavior and in terms of the other factors' degree of contribution to that behavior (size of loading).

Table 8–1 first of all suggests a battery for measuring overall neuroticism level with a minimum number of tests. For example, the first six tests in the table not only measure neurotic process factors but are also heavily contributed to by other neurotic-contributory sources, such as U.I. 19—, 21—, etc. These tests thus provide the maximum coverage of neurotic-contributory factors in a minimum number of tests.[5] Most contribution to neurotic process behavioral expression comes from within the neurotic-contributory family of factors, an interesting point to which we shall return again presently. For the present, its significance is that if such factors act in concert to increase level on neuroticism in general (by these ten behaviors), this is not a specious contribution to total level, since the sources are for the most part themselves neurotic-contributory. That is, these neurotic-contributory (but

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[4] Premsia (U.I. 16—), though one of the five neurotic process factors, is omitted from the above list for purposes of simplification in this exploratory treatment. Its relationships to the other neurotic process factors are, however, apparent in Table 8–1 and Diagram 8–2.

[5] In actual construction of a battery of tests for neuroticism (Chap. 15), the following other considerations also pertained: first, a balanced representation of all four neurotic process factors, including U.I. 22 and U.I. 24, whose individual behaviors are typically not affected by other neurotic-contributory factor sources, and, second, other things being equal, some preference given to tests which, as tests, discriminate best between neurotics and normals.

TABLE 8–1

NEUROTIC PROCESS BEHAVIORS MOST INFLUENCED BY CONTRIBUTIONS FROM GENERAL PERSONALITY FACTORS (NOT NEUROTIC PROCESS), IN THE FIRST-ORDER OBJECTIVE TEST REALM

Behavior Variables in Neurotic Process Direction. (with Master Index No.)		Identifying Loading on Neurotic Process Factors (U.I. no. for factors)	Other Factors Enhancing This Behavior; Pole of Factor Contributing to Neurotic Process Direction. (U.I. no. for factors)
1. High Motor Rigidity	M.I. 2	23–, 29–	U.I. 1–, 16–, 19–, 26–, 33–
2. Poor Immediate Memory	M.I. 167	23–, 29–	U.I. 1–, 21–, 26–, 35+
3. Poor Computational Performance	M.I. 199	23–	U.I. 1–, 19–, 21–, 25–, 35+
4. Poor Two-Hand Coordination	M.I. 41	23–	U.I. 1–, 19–, 27+
5. Low Index of Carefulness	M.I. 51	23–	U.I 1–, 17–, 19–
6. Slow Tempo of Tapping	M.I. 268	29–	U.I. 16–, 21–, 25–
7. Much Critical Hostility	M.I. 116	24+	U.I. 19+, 20+, 28+, 35–
8. High Susceptibility to Annoyance	M.I. 211	24+	U.I 20+, 28+, 35+
9. High Tendency to Agree	M.I. 152	24+	U.I. 20+, 21+, 28+
10. Low Ratio of Regularly to Irregularly Warned Reaction Time	M.I. 5	22–	U.I. 17–, 32+ (Introversion)

not neurotic process) sources can alter the form or pattern of neurosis expression on the ten behaviors without spuriously altering its total level. This is the case generally for U.I. 23 and U.I. 29, but effects on U.I. 22 and U.I. 24 behaviors, as indicated in Table 8–1, tend to come from general personality sources which are not themselves neurotic-contributory.

Just as with Diagram 8–1, we can read from left to right in Table 8–1 and find the factor sources which affect level on each of these ten neurotic process behaviors, thus pinpointing suspected determiners of variation in the shape of the ten-point neurosis expression profile. Some of these sources are not themselves neurotic-contributory and the interpretation of their operation is just as was the similar case for anxiety (pp. 141 f. and below).

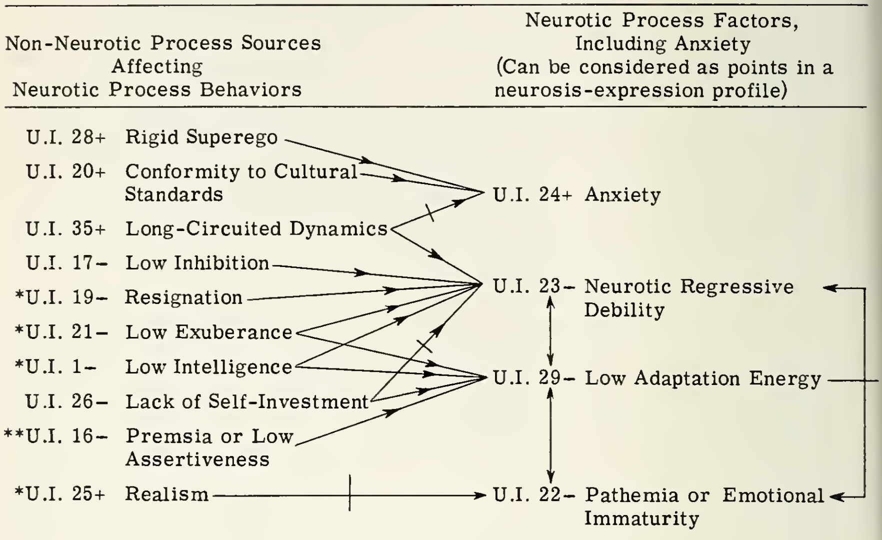
As for U.I. 24 Anxiety, if we wished to measure it alone, we would naturally choose several tests other than 7, 8, and 9 in Table 8–1, basing our choice on the U.I. 24 loading pattern of Table 5–4. Such a battery is discussed in Chapter 15. But the U.I. 24 Anxiety test behaviors presented in Table 8–1 show that, like neurotic-process behaviors in general, the level and pattern of anxiety behavior expression is widely affected by multiple sources other than U.I. 24 Anxiety. The possible effect of these sources on total apparent level of U.I. 24 ought to be partialed out, since these sources are not themselves type-defined as anxiety. Thus, that portion of the increased susceptibility to annoyance (No. 8 in Table 8–1) which is contributed by U.I. 20, 28, and 35, is not bona fide U.I. 24 Anxiety and must be discounted in computing total level of anxiety. Such refinements in analysis require measurement of the factors other than U.I. 24 which could affect score on anxiety-component variables.

Table 8–1 has described the neurotic process behaviors most affected by other-than-neurotic process sources. Diagram 8–2 organizes similar information in terms of the *factor sources* which tend to have most effect on the approximately twenty-five known neurotic-process behaviors. Much of this information is already apparent in the right-hand column of Table 8–1, but not all of it, since there are cases where a neurotic process behavior is affected by only one other-than-neurotic process source, and such cases will not appear in Table 8–1. It should also be noted that Diagram 8–2 orients towards expression of neurosis in terms of a four-point *factor* profile, rather than a ten (or more) point *test* behavior profile.

Study of Diagram 8–2 shows that scores on each of the neurotic-process factors are affected by at least one other source which is not neurotic process, as follows: U.I. 23— by six such sources; U.I. 29— by four; U.I. 24+ by three; and U.I. 22— by one. Among the ten

DIAGRAM 8–2

MAIN FACTOR-SOURCES DETERMINING VARIATION IN THE EXPRESSION OF NEUROTIC PROCESS, INCLUDING ANXIETY


Non-Neurotic Process Sources Affecting Neurotic Process Behaviors
Neurotic Process Factors, Including Anxiety (Can be considered as points in a neurosis-expression profile)
U.I. 28+ Rigid Superego
U.I. 20+ Conformity to Cultural Standards
U.I. 35+ Long-Circuited Dynamics
U.I. 17– Low Inhibition
*U.I. 19– Resignation
*U.I. 21– Low Exuberance
*U.I. 1– Low Intelligence
U.I. 26– Lack of Self-Investment
**U.I. 16– Premsia or Low Assertiveness
*U.I. 25+ Realism
U.I. 24+ Anxiety
U.I. 23– Neurotic Regressive Debility
U.I. 29– Low Adaptation Energy
U.I. 22– Pathemia or Emotional Immaturity

Key:

→ Relation of "Positive Cooperativeness." That is, factor to left contains at least three or four variables in common with neurotic process factor to right. Thus, at the pole given, it is a source which affects these variables in the neurotic process direction.

↕ Positive Cooperativeness (see above) between two neurotic process factors.

┼→ Relation of "modification." At one pole the factor to the left enhances certain behaviors in the indicated neurotic process factor; at the other pole it enhances certain other neurotic process behaviors in this factor.

* *Neurotic-contributory* factor, although not neurotic process. The other five factors in this column are not significantly neurotic-contributory.
**U.I. 16 is actually a neurotic process factor (see Chap. 5), but is not so considered for purposes of the present discussion.

sources affecting neurotic-process behaviors, five tend to be neurotic-contributory, while five are not. The most powerful sources are U.I. 1—, 21—, 26—, and 35+, each affecting level on two of the four neurotic process factors. As noted before, the value of these data for measurement-based diagnosis is as follows: In assessing objective test expression of neurosis by means of profile on the four neurotic process factors, at least ten other factor-sources should be measured to pinpoint determiners of variation in neurotic process expression (profile shape).

Thus, unusual salience in the U.I. 23— neurotic profile score may be at least partially accounted for by measuring and understanding the contributions from U.I. 17—, U.I. 19—, etc. That is to say, a neurotic person who is also U.I. 17— (Uninhibited) scores differently on the U.I. 23— profile point than does a neurotic person who is U.I. 17+. In most cases, the effect is consistent. Thus, because it cooperates with U.I. 23—, U.I. 19— endowment always carries with it a tendency to increased Neurotic Regressive Debility, U.I. 23—, and, if this were the only influence operating, it would tend to increase total neurotic process level as well as shape of the neurotic process profile. But usually, since *T* factors are essentially independent of one another, other outside sources will be acting in a counterweighting direction to lower level on another neurotic process factor. Thus, as U.I. 19— endowment tends to produce a high point at the U.I. 23— neurotic profile position, U.I. 20— may be similarly acting to reduce U.I. 24 Anxiety, producing a low point at that neurotic profile position. Total neurotic process level could still remain the same under such circumstances and would also tend to remain the same under the action of modifying factors U.I. 25, 26, and 35 (see key to Diag. 8–2) which, depending on their pole of endowment, tend to augment certain behaviors loading a factor while diminishing others, leaving total score on that factor essentially the same. The effects of such modifying factors would therefore not appear on a neurotic process profile of total factor scores, but only as the profile is more finely fractionated into a dozen or so neurotic process test behaviors.

As for relations among neurotic process factors, U.I. 23 and 29 are positively cooperative, which means that, other things being equal, values on these two profile points will rise and fall together. U.I. 22 modifies U.I. 23 and U.I. 29, while U.I. 24 has neither cooperative or modifying relations with any of the other three neurotic process factors. To fully understand expression of U.I. 24 Anxiety (profile shape on test behaviors loading U.I. 24), contributing sources U.I. 20, 28, and 35 must be measured to determine their effects on apparent total level of anxiety and on variations of anxiety expression in terms of the U.I. 24 test profile.[6]

The Diagram 8–2 data and discussion have done nothing more than describe available information on the multiple-source determination of variation in the expression of neurosis and anxiety. The theoretical significance of these data will be up for discussion in Chapters 12 and 13 and in subsequent publications when a more final view of cooperative and modifying relationships among factors is available. Here, we have merely tried to show the rough outlines of data demonstrating that the multiple-source mechanism does exist and requires very broad measurement of the entire personality in order fully to understand variations in the expression of neuroticism and anxiety.

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[6] Certain second-order objective-test factors, considered as influences, also affect levels on the various first-order, neurotic-process factors. These are noted mainly in the interest of suggesting hypotheses for future research, since second-order, objective-test factors are not yet firmly established and, at present, fail to account for most of the information in first-order neurotic-contributories (see Table 5–2). The effects are: F(T)VII+ augments U.I.24; F(T)IV— augments U.I.22—; F(T)II+ and F(T)V— accentuate U.I. 23—; and F(T)IV+ augments U.I. 29—.

Summary

1. Individual differences in the expression of neurosis and anxiety can be represented as differences in profile on variables loading a factor, it being understood that different proportions of contributions from loaded variables can still eventuate in the same total level of neuroticism or anxiety. One mechanism is proposed and discussed, whereby profile shape can change even though total level remains constant.

2. The basic explanatory premise is that any given variable in a factor profile can be influenced in its level by other factor-sources. Certain general personality factors tend consistently to raise or lower scores on neuroticism or anxiety variables. If several such factors act together they will speciously increase or decrease apparent neuroticism or anxiety total levels, by raising levels on the variables they affect. As such factors act in opposition to one another, that is, one to increase, one to decrease anxiety or neuroticism component scores, they will affect the pattern of anxiety or neuroticism expression, without altering total level.

3. Measurement should be as broadly based as possible, in order to discount specious total level influences stemming from non-neurotic or non-anxiety factors and, generally, to trace influences in the total personality which mold a given person's manner of expressing anxiety or neurosis.

4. In terms of the above rationale, preliminary data are provided, identifying the multiple personality influences which determine variation in the expression of neurosis and anxiety.

CHAPTER 9

ANXIETY AND NEUROTICISM DISTINGUISHED AS STATES AMONG MALERGIC STATES OF STRESS, FATIGUE, AND DEPRESSION

Properties of States and the Research Techniques for Finding Them

Popular speech recognizes that one can have an anxious person—a person who all his life is characterologically operating at a higher anxiety level—and a typically non-anxious person who is temporarily in a highly anxious state. Is there a continuum in nature and form of expression between permanent (trait) and momentary (state) anxiety?[1] That is to say, is characterological or trait anxiety just temporary state anxiety held permanently high or are trait and state different things with different patterns? In other words, is the verdict of language true in treating them as the same concept, susceptible to the same measuring instruments and, except for minor features, differing only in duration?

Scientifically, it is safer to assume that trait and state forms are different until they are proved to be the same. Anxiety must initially be investigated as a state in its own right, after which it may be compared with the trait we now know. Recognition of states and their relation to traits constitutes an urgent general problem in psychology, which Haverland (113), Nowlis and Green (168), Henrietta V. Williams (222), and others have variously attacked. Although there is thus a whole development of statistical and logical concepts with regard to psychological states, we have need to take up here only the points of highest relevance to the present specific problem of clinical states.

If we turn from anxiety to neuroticism, we notice that popular speech contains less clear implications on the correspondence of state and trait. It does not speak of a momentary state of neuroticism though, hopefully, clinicians speak of a temporary *condition* of neuroticism, lasting months or years, implying that it is curable or that at least some characteristics of the condition will disappear. Possibly there is a wisdom in traditional and clinical language here, recognizing real differences in the capacity of different psychological states to establish themselves, to be readily or completely reversible, to oscillate in shorter moods rather than in longer life periods, and to change in part rather than in whole.

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[1] Unless otherwise specified, the term "*trait*," as used in this chapter, refers to anxiety and neuroticism as characterological or relatively permanent features of the personality. It is to be distinguished from the term "*trait definition*," which refers to one way of deciding whether or not a factor can represent a clinical concept (see Chaps. 4 and 5). Thus, the factor representing anxiety as a characterological trait was so designated both by trait definition (involving behavior that looked anxious) and by type definition (discriminating high from low anxiety types, as clinically evaluated). Again, the term "trait" in this chapter indicates relative permanency in a characteristic, however that characteristic is defined, not the manner in which a factor is defined in relation to a clinical concept.

On the other hand, in regard to the number and nature of abnormal states, popular speech is as characteristically loose and inaccurate as with traits. State description reaches its nadir, indeed, in the individual who can only describe his states in two terms, "lousy" and its presumed opposite, "swell." However, slang and logical analysis occasionally cross paths, and the concept lousy can be taken as at least a rough starting point for the concept of a *malergy* (44, p. 671) which we need to define at this point.

By a malergy we mean any state, either in its introspectible or behavior pattern form, which is characterized by inefficient, subnormal, maladaptive functioning of the organism, e.g., fatigue, depression, worry, confusion. However, this possibility of indicating by a single term the particular class of states, among states generally, with which we are here specifically concerned, is by no means the same as lumping together and failing to distinguish *different* malergic states. Indeed, we describe this whole class in order to make it clear that anxiety, stress, and neurotic states are not the totality of malergies, but a special subgroup and that it is a mistake to assume that any malfunction or subnormal state is to be considered a "stress" state. Parenthetically, there could be state dimensions, such as manic elation *vs.* depression, in which both ends are malergies. In summary, we shall speak of a genus of malergic states, with many of which (e.g., fatigue, bad temper, antisocial mood) we are not concerned except to distinguish them as a background from anxious and neurotic states. We may tentatively assume that neurotic states like neurotic traits are likely to rank themselves into a group of moderately neuroticism-involved states, akin to the neuroticism-contributing factors and a core of top-ranking associates which we can call neurotic process or neurotic phase states. That is, we shall recognize degrees within the neurotic states which are in turn among malergic states.

Before we turn finally to the methodological problem of recognizing the various states, we should take note, at the level of common observation, of a certain statistical property likely to hold true in most total measures of such malergic patterns, namely, that they are rarely going to be distributed normally. From a state of healthy (normal in the biological sense) functioning there is commonly deviation in only one direction. By definition, we should expect many measures of malergic states (one person on many occasions or many persons on one) to have a J-curve distribution, although, alternatively, both may be departures and the curve may be normal or leptokurtic, as in elation-depression. In the first case, if we think in terms of the usual bipolar definition of a factor, there will be no second pole except normality. That is to say, if we write such dimensions in bipolar fashion, many of them will share at one pole the label "normal functioning." Thus, if we were concerned exhaustively with a taxonomy of malergic states it would be necessary to begin by distinguishing between "hypo-malergies" or "deficiency malergies," on the one hand, and "hypo-hyper malergies" on the other.

The most powerful technique yet known for determining the existence and delineating the specific pattern of states is P-technique factor analysis and its transpose, O-technique, though others will also be employed here, notably Incremental R-technique (35, 65, 70). In P-technique we measure a person day after day, one or more times per day, for perhaps a hundred days, on forty variables, for example. These variables will be such as might theoretically be expected to be influenced by or express the transitory states in which we are interested, e.g., measures of alertness, of emotional moods, introspective self-ratings on worry, stress, tiredness, etc., and ratings by observers on apparent tenseness, amorousness, irritability, sociability, etc. The factors extracted from P-technique or incremental R-technique represent uniquely defined, independent dimensions of change.

Statisticians occasionally suggest other analytic designs for recognizing states, such as Fourier analysis, and devices used in analyzing spectra. These, however, presuppose all kinds of special conditions which most psychological data cannot meet—principally, that we know already the existence and nature of the very patterns of mood, the number and nature of which it is the main object of research to discover! In short, P-, O-, and incremental R-techniques remain the major, and often the only, avenue to discovering and defining states without subjectively and arbitrarily naming them before we start.

Some psychologists, though sufficiently convinced that they aim to find rather than define by fiat these states, may yet think that by some simpler process, such as plotting the curves of level of each variable against time (with successive occasions numbered along the base line), they can hope to see which variables functionally go together. For example, depression (introspected) and slow reaction time (as measured) have long been known from psychiatric observations to go together, and various experimenters have plotted just such curves, with two or three variables at a time, concluding, when the agreement looks good, that they constitute expressions of a single state, the movement of which follows the curve common to the variables.

Some progress is, of course, possible by such simple methods, but where variables are numerous, and when more exact functional determination is required, the more developed method of P-technique is needed. Essentially, this takes as data the same longitudinal plots as we have just mentioned (a score-occasions matrix), but instead of trusting the eye, tests the going-togetherness over time by working out the correlation coefficients among all variables over the time series. It then factor-analyzes this matrix, just as in R-technique, arriving at the major functional unities defining the dimensions along which daily (or longer period) variation takes place.[2] Such a process pulls out distinct dimensions where correlation cluster procedures fail to do so. Thus, the cluster of variables seen to go together in what is roughly called excitement could prove to be due to two or three distinct factors.

Problems due to the Recency of a Sound Methodology of Research on States

As with the individual difference trait analysis, which corresponds to the characterological inspection and dissection of the neurotic and anxious person, so here in analyzing states, it is most desirable to see the clinical or pathological patterns against the background of normal variables and variability. So neglected, however, has the study of normal and abnormal states become, among the older generations of psychologists, for lack of confidence in available techniques, that a basic taxonomy of moods and malergies in the typical person in our culture does not exist, though rapid progress toward it has been made in the last five years. Indeed, if the various research results and interpretations brought together elsewhere (44, Chap. 15) are sustained, it would seem that we can already recognize at least nine or ten major, distinct, unitary state dimensions, that is, dimensions of reversible change in introspected mood, in behavior, and simultaneously, in associated physiological responses. These ten general mood states are additional to the nine or more dimensions of specific desire becoming visible in terms of the distinct ergic drive tension levels, e.g., strength of gregarious, sex, fear, assertive ergs, etc., which are very recent (50, 56, 61) and with which we shall not be primarily concerned here.

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[2] O-technique is the transpose of P-technique, just as Q-technique is the transpose of R-technique. That is to say, one turns the test-occasion score matrix over on its side and correlates occasions instead of variables. Like any transpose factor analysis, it will eventually yield the same state factors, but will reveal them in terms of occasions which stimulate a common reaction, for example, fatiguing occasions, depressing occasions, worrying situations, etc. (35, p. 106), instead of directly in states in the response variables themselves.

Experimentally confirmed state concepts have been slow to get into research circulation where they are needed, partly because of the technical complexity of P-technique and partly because with the present roughness of factor analytic resolution, the standards of statistical proof are not simple. It is best at present to seek statistical proof in terms of experimental replication for a sufficient number of different individuals and experimentally independent P-technique researches arranged side by side. The verification of some important emerging pattern thus requires several experiments each demanding a different person and several months of experiment, as well as a very careful factor analysis and rotation. Patterns have to be put side by side, because apart from the need to recognize and cancel the effects of sampling and other error, it is also to be expected that the pattern of expression of a mood or malergy will, to some extent, be truly idiosyncratic to an individual. We can initially anticipate, however, that fatigue or anxiety will have much in common, behaviorally and physiologically, for all people, and that this common trait or state pattern will be reached by averaging the loading patterns for many people. This expectation has been verified: similar factor patterns can be found and put side by side for different people, and the common human character then proves to be more prominent than the idiosyncratic differences. It would appear from present knowledge of standard errors of loadings, and other considerations discussed in a recent overview (38), that resemblances in P-technique are of about the same order as in R-technique studies and that, but for differences in sampling (of occasions) and measurement error, the response patterns in different individuals would be highly similar. It is unfortunate, however, that we have to operate in a new area which is only just beginning to crystallize, and some of the conclusions given here will, of necessity, have to rest on only a few independent researches.

As in inter-individual difference study (R-technique), so here in intra-individual, single person (P-technique) findings, it is necessary to single out for more intensive study the dimensions that are of special interest to the clinician. Concentration on a sub-group of malergies must not be unconsciously undertaken, however, in so arbitrary and restrictive a way that we end by excluding what might, with other semantic predilections, be considered relevant. Semantics alone could easily lead us to ignore patterns which are conceivably special forms of anxiety or neuroticism. We have also the lesson of the previous chapters before us—that while anxiety and neurosis as traits can be identified with a limited number of factors, the total expressions of anxiety and neurosis are affected by almost the entire range of known, normal personality factors. The authors' dilemma in a book such as this is that they have no space or purpose to deal with the general psychology of personality, yet at every turn the clinical discussion requires reference to such a general background. Our plan must therefore be to refer to the general personality methodology of states, to indicate briefly the total number of states by reference elsewhere, and then to concentrate on a few of greater clinical relevance. Invariably, it is valuable to the research-minded reader for the authors to make sufficient reference to the total setting and data indications in order that he may entertain alternative hypotheses which they may not perceive. Even with this objective, however, only certain data can be held in the area of sharper focus.

In studying trait patterns our plan has been to present behavior rating and questionnaire response before turning to objective tests (since the latter often cannot be immediately brought into structural relation with the former), but it so happens, in states, that the three media of observation have generally been combined from the beginning, because P-technique lends itself especially well to such joint recording and factoring. Consequently, except for some evidence now to be given purely in the *Q* medium, which more easily illustrates the principle than does later combined-media data, the questionnaire-introspective and objective test behavioral patterns will be presented jointly, first for neuroticism, then for anxiety.

Dimensions of State Change in Q Data Found by Incremental R-Technique

Although our methodological introduction has concentrated on P-technique, the first data to be examined are derived from the design we mentioned as being parallel to but not identical with it, namely, incremental R-technique, which yields closely comparable evidence. In this method, a group of people is measured twice on an array of variables. For the initial research in this area (CQ2, Appendix I) this array was wide, namely all the factors in the 16 P.F. questionnaire (62), to ensure the most comprehensive survey of state dimensionality. After an interval of nine months, the same ninety-five students were tested again. The time being too long for them to recall their detailed original responses, they then responded to some extent differently, partly due to random error in self-evaluation and partly to real changes in such traits as can fluctuate over months. It is not necessary that putative anxiety, neurosis, or fatigue-producing stimuli be deliberately introduced by experimental manipulation. Life itself can be fully depended upon to induce a sufficient number of anxieties, conflicts, and occasions of overwork in a hundred or so adults over such a period. Both in our P– or R-incremental technique studies we have sometimes left the stimulus change to life, and sometimes we have introduced insecurities, threats and stresses—but with essentially similar results as far as response pattern was concerned. However, this *Q* medium, incremental R-technique study, subsequently referred to as CQ2 (Appendix I), left personality state change to everyday events and their emotional impacts.

We first obtained the change scores, positive and negative, from the first to the second occasion of testing, on each primary personality dimension for each of the ninety-five students.[3] We then intercorrelated and factored these increment or change scores, just as is done for absolute scores in R-technique. This process should yield an estimate of the common state factor form for the population, essentially equivalent to what would be obtained from averaging, over a series of many individuals, their unique two-occasion, P-technique patterns. The relation of incremental R- and P-technique is that the former works from many people and a one-occasion interval, while the latter uses one person and many occasion intervals. Consequently, R-incremental technique irons out peculiarities of state-pattern due to people, and P-technique, those due to occasions. An important peculiarity that might arise due to occasion sampling differences is a systematic difference between the pattern of rise in a given mood or state and its homeostatic *return*—as the accompaniments of sunset are not exactly a reversal of those of dawn. By averaging several incremental R patterns on the one hand and several P-techniques on the other, we should, in principle, converge on the same central patterns freed alike of the peculiarities of occasion, of rise and fall sequence, and of individual idiosyncrasy.

As Table 9–1 shows, the striking result of the R-incremental questionnaire analysis (CQ2) is that the questionnaire change patterns resemble in number and nature those found for characterological individual-difference dimensions (compare Table 4–3). These are, of course, second-order factors since they are based on correlations among first-orders. The matching of patterns between state and trait is at least suggestive for all four factors, and is quite good for F(Q)I and F(Q)II.

One of the second-order state (incremental) factors is clearly the introversion-extraversion (or Invia-Exvia to be exact) dimension, and shows indisputably that although this has commonly been considered a temperament dimension and may still justifiably be considered to have a good deal of its variance constitutionally, people do vary along

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[3] We worked from unadjusted increments or decrements in raw scores. Ideally, it is desirable to eliminate whatever correlation exists between the first and the second measurement due to common error of measurement, using McNemar's formula (154), before accepting the difference measurement. On the other hand, particularly in exploratory studies, it would be a mistake to use formulae advocated by some to eliminate all correlation between the difference and initial and final measures, for there may be real, organic reasons for a high base or trait score being associated with a high change score.

TABLE 9-1

SECOND-ORDER *Q*-DATA STATE FACTORS IN INCREMENTAL R-TECHNIQUE: THE CQ2 STUDY

(Compare Table 4-3 for Trait Patterns)

State F(Q)I+ Invia *vs.* Exvia		State F(Q)II+ Free, Conscious Anxiety		State F(Q)III+ Pathemia *vs.* Corticalertia		State F(Q)IV+ Promethean Will *vs.* Subduedness or Resignation	
Factor	Loading	Factor	Loading	Factor	Loading	Factor	Loading
Q_2+ More Self-Sufficiency	.39	C– Low Ego Strength	–.77	I+ Premsia or Tender-Mindedness	.50	H+ Parmia	.69
A– More Schizothymia	–.38	Q_3– Low Will Control	–.51	N– Naiveté	–.50	L– Less Suspiciousness	–.64
M+ More Autia, Non-Conformity	.36	Q_4+ More Ergic Tension	.48	G+ More Superego	.28	E+ More Dominance	.52
O– Less Guilt Proneness	–.28	O+ More Guilt Proneness	.37	Q_2– Less Self-Sufficiency	–.26	O– Less Guilt Proneness	–.36
F– More Desurgency	–.22	M+ More Autia, Non-Conformity	.31	A+ More Cyclothymia	.18	N+ More Sophistication	.21
Q_1+ More Liberalism	.20	Q_2+ More Self-Sufficiency	.30				
H– More Threctia	–.12						

it over time, from occasion to occasion—for what reason we do not yet know. The primary factor structure shows that introversion-extraversion is very diversely composed from a nature-nurture point of view. Factors H and, to a lesser degree, A are heavily hereditary, but F has been found largely environmental (52). There are at least two possible ways of interpreting this fluctuating state factor. First, it involves hereditary components, but even hereditary traits can fluctuate with changing physiological and general conditions. Second, the total trait behavior pattern is contributed to by both hereditary and environmental components, but in the state factor the fluctuation arises relatively little from fluctuation in the constitutional components.

A second incremental factor has the general pattern of what has been indexed here and elsewhere as F(Q)III, Pathemia *vs.* Corticalertia. This hypothalamic overactivity (Pathemia) pattern is significantly or almost significantly involved in neuroticism (Chap. 4) and is quite similar to U.I. 22— in objective tests. The reasons for the title "Pathemia," with the connotation from the Greek state of feeling as opposed to a state of clear cognition, have been discussed previously (pp. 47 f.) and will be dealt with further as more evidence is assembled.

F(Q)II here is an excellent match for the second-order Anxiety trait factor (Table 4–3) and shows that we can indeed speak of Anxiety as a state, meaning thereby essentially the same questionnaire pattern as for anxiety as a trait.

F(Q)IV, the second-order Promethean Will *vs.* Subduedness dimension, is also indicated here as a state, but its match to the trait leaves much to be desired, and further research is necessary to decide how much of the difference is real, and how much will disappear with better definition of this recently discovered dimension.

There is already a partial replication of the above CQ2 study. In this replicating study (R3 in Appendix I), state dimensions were again obtained by incremental R-technique, by factoring *changes* in response in eighty-six young men over a four-week interval. Of the 69 response measures employed, 52 were of objective test type while 17 were of questionnaire type, including eight questionnaire first-order factor scores for factors A, C, F, H, I, M, O, and Q_4.

Three of the four state factors discussed above were identified in the resulting factorization, as much or more from objective test markers as from questionnaire markers. These factors were: Anxiety, Pathemia, and Subduedness. The four Anxiety-state *Q* markers in R3 were Q_4+, C—, O+, and M+ (see Table 9–1). All of these were in the expected correct direction, and in almost exactly the same order of loading size as in CQ2, with Q_4 (+.40) and C (—.29) being the highest. As for the Pathemia factor, seven of the eight questionnaire factors in the R3 study were in the same direction as they loaded on Pathemia in CQ2 (Table 9–1), but all loadings were low in R3. Pathemia was in fact identified in R3 almost entirely on the basis of its objective tests, and the same was true of the Subduedness factor. In the latter case, none of the important *Q* factor markers (E+, Q_1+, N+) were present, and questionnaire state matchings must therefore be considered inconclusive.

In general, the state second-order questionnaire factors found in R3 provide good confirmation of the Anxiety state pattern in CQ2 and are at least consistent with the CQ2 Pathemia state pattern, while questionnaire results are inconclusive or missing for the Subduedness and Introversion questionnaire state factors. Generally, questionnaire factor loadings were lower in R3 than in CQ2. This fact and other failures to match CQ2 results at a higher level of confidence could be caused by the shorter time interval employed in R3 (four weeks as compared to nine months in CQ2), the fact that R3 systematically manipulated rather severe stresses while CQ2 did not, or, finally, R3's probable failure to measure *Q* factors as reliably as did CQ2. Future research must decide these issues. For the time being, we shall build upon the relatively clearer, better-marked CQ2 study, though always bearing carefully in mind that these nine-month-trend factors may not necessarily correspond perfectly to four-week-trend, one-week-trend, etc., state factors in the final analysis.

In summary, there is good evidence in the *Q* data medium that Anxiety, Invia, Subduedness and Pathemia can be recognized as states with patterns similar to those defining trait individual differences. It follows that they can be as meaningfully measured as states as in the form of traits.

How great the state level variance is, relative to the inter-individual variance, is something we have not attempted to answer precisely until factor forms are more exactly established. But, in the present *Q* data, the state variation can be fixed at a fairly substantial fraction of the individual difference variance. The question is of some importance theoretically, for if, between trait and state, there is both identity of pattern and identity of variance, a trait could be nothing but a state frozen at one point in time. On the other hand, a good but not a perfect agreement of patterns, as well as an indication that state variance is the lesser contribution, makes the trait a substantial entity apart from state variabilities.

States Recognizable in T Data Incremental R-Technique Studies

Turning next to objective tests we find that about a dozen state dimensions have recently been found in an incremental R-technique study, R3 (65, 70, and Appendix I). This study dealt with eighty-six young adult males, in a design exactly parallel to the above CQ2 questionnaire factoring, but using a re-test interval of four weeks and employing an array of fifty-two objective personality tests, including the chief markers from this laboratory's series of initial seven R-technique studies (39). Eight questionnaire primaries were also included as discussed in the preceding section.

The problem posed for questionnaire measurement in the preceding section is now considered in terms of objective tests.: Are the same objective test factor patterns recognizable in states as in R-technique trait analysis? Of the fourteen state factors obtained in the R3 incremental R-technique, seven or eight were quite confidently matched to trait patterns and the matching extends to eleven, if a lower confidence level is accepted. The trait factors concluded to appear also as states are U.I. 17, 19, 22, 23, 24, 26, 35, and probably 28. They thus include state expressions of the neurotic process factors of Anxiety, Pathemia, and Neurotic Debility (U.I. 24+, 22−, 23−) and, in addition, several factors which achieve or approach significance as neurotic-contributories (U.I. 19−, 28+, 17+).

It must be noted again that while there is no exact correspondence between the hereditary-environment classification and the fluctuant *vs.* non-fluctuant classification, yet there tends to be more fluctuation in the traits indicated to be environmental in general origin. The most heavily hereditarily determined factors are U.I. 1, 20, and 21, and these do not appear as fluctuation patterns. When factors like 17 and 19, with appreciable hereditary determination, do fluctuate, one can hypothesize that the average level over several testings is considerably hereditarily determined, but that fluctuations about this level occur for physiological or other internal reasons. The marked exceptions to an indicated rule that environmentally determined factors are more fluctuant, are actually absences from this list of fluctuants of certain factors that are known to be environmental. However, this could easily be due to absence of sufficient markers.

The possibility must also be considered that the age at which nurture operates is important in relation to a trait appearing or not appearing in a fluctuation, Incremental R-technique study. For example, it is not so surprising that U.I. 16, which is considered to represent personality characteristics expressing the degree of familial overprotectiveness in early childhood, should be sufficiently fixed by adult life not to fluctuate. Similarly, present findings, which omit U.I. 29 from short-term fluctuant factors, would favor the view that U.I. 29 is not a vigor of will, depending on energy level from daily stimuli and fatigues, but is a fixed characterological feature deeply rooted in early training. Finally, one notes the absence of a state form of U.I. 20—the dimension involv-

TABLE 9–2

The Incremental Factor Patterns of Anxiety and of Some Important Clinically Relevant Factors in Combined *T*- and *Q*-data *
from the R3 Study (65)**

Factor 1: Free Anxiety with High General Autonomic Activity
[like U.I. 24+ (Trait) and P.U.I. 9 (State)]

+41	More anxiety-tension symptoms (self-checklist)
+40	Q_4+, Higher Ergic Tension
−35	Less confidence in assuming skill in untried performance
−32	Less long-circuited (predominance of short-term goals)
−31	Less persistence in unrewarding situations
+30	Higher systolic pulse pressure
−30	Lower mean handwriting pressure
−29	C−, Low Ego Strength
+27	Greater volume of saliva secreted
−26	Less decrement due to sound distraction
−26	Lower absolute skin resistance
−25	Examinations in the more remote future, i.e., not occurring at the time
−22	Smaller pupil diameter in stress
−21	Less lonely (lower ratio acquaintances/friends)
+20	Higher sex erg (sex needs)
+20	More slowing of reaction time due to electric shock
+16	More slanting lines used in Cursive Miniature Situation
−15	Low ratio warned/unwarned reaction time
+15	Higher level of involuntary muscle tension in right arm

Factor 2: Ergic Regressiveness versus State of High Mobilization
(like U.I. 23−, Low Mobilization and P.U.I. 8−, Overwroughtness)

−46	Less manifestation of reality-oriented, cultured sex expression
−40	Lower ratio accuracy to accomplishment
+39	Higher manifestation of crude sensual sexuality
−35	Absence of treadmill run challenge
+30	More rigidity (classical motor and perceptual)
−26	Lower ratio warned/unwarned reaction time
−26	Smaller size of myokinetic movement
+24	More acceleration to competitive situations
−21	O−, Low Ego Strength
+21	More errors made in complex reaction time
−21	Less rejection of entering dangerous situations
+20	More anxiety-tension symptoms (self-checklist)
+20	Preference for weaker smells
+18	Higher absolute level of galvanic skin response
−16	I−, Tough Insensitivity

Factor 3: Greater Superego Action or Guilt State versus
Less Rigid Superego
(like U.I. 28, Rigid Superego, and P.U.I. 10−, Increased Superego Demand)

−62	Examination appearing in future, not now
−57	Lower skin resistance

TABLE 9–2 (cont.)

Factor 3 (continued)

−36	Less fidgeting (fidgetometer)
−33	Preference for stronger smells
+31	More critically severe
+30	Relatively more fluent about own than others' characteristics
+29	Greater number of slanting lines incorporated in miniature situation (CMS)
+28	More tendency to agree
−26	Lower sex erg (sex needs)
+24	Q_4+, More Ergic Tension generally
−24	Less long-circuitedness (goals nearer in time)
−23	Smaller pupil diameter in stress
+22	Higher volume of saliva secreted
−22	Relatively less fluent in self-criticism
+21	High level of involuntary muscle tension in right arm
−20	Less readiness to admit common frailties
−20	Low index of carefulness
+19	More errors made in complex reaction time
−19	F−, Desurgent state
+18	More threatening objects perceived in unstructured drawings
−16	Less overestimation of length of fear periods

Factor 4: Depression-Pathemia

(like U.I. 22−, Pathemia or Low Corticalertia, and P.U.I. 2−, Depression)

+46	More readiness to admit common failings
+43	High fear erg (accident-disease)
−43	Lower amount of conditioning of galvanic skin response (GSR)
−37	Relatively less fluent about self
−34	Fewer errors in complex reaction time
+34	Retardation in irregularly warned reaction time
−34	Smaller magnitude of hand tremor
−33	Lower level of involuntary muscle tension in right arm
+31	More persistence in unrewarding situation
+30	More recovery of GSR level after shock
+28	More self-sentiment (more desire for self-control)
+27	More threatening objects perceived in unstructured drawings
+27	More saliva secreted
−26	Fewer CMS circles used
−26	Lower sex erg (sex needs)
+20	Increase in exam imminence
+19	Slower tempo of leg circling
−18	Relatively less fluent in self-criticism
+16	More anxiety-tension symptoms (self-checklist)
−16	Less fidgeting (fidgetometer)
−15	Lower ratio reg./irreg. warned reaction time
−15	Smaller pupil diameter in stress
+15	More culturally acceptable expression of sex interest

TABLE 9–2 (concluded)

Factor 5: Resignation

(like U.I. 19–, Lack of Critical Exactness, and P.U.I. 11+, Sub-Thyroid)

+53	More decrement due to anxiety sound distraction
+47	Faster ideomotor speed
–41	Less increase in heart rate after startle
–40	Low acid (pH) saliva
–34	Fewer anxiety tension symptoms
+31	More distraction from work by aesthetic material
–31	Lower amount of GSR conditioning
–30	Less critical severity
+30	Relatively more fluent in self-criticism
–29	Poorer immediate memory for words
–24	Treadmill run challenge not present
+24	Higher fear erg (atomic terror)
+24	Higher ratio accuracy to accomplishment
+23	More mind-wandering (less ability to do problems in head)
–22	Less persistence with response in unrewarding situation
+21	More CMS slanting lines used
+21	More acceleration to competitive situations
+19	More tendency to agree
–17	Less recovery of GSR level after shock
–16	Preference for stronger smells

Factor 6: Restraint or Unreactiveness to Immediate Ergic Stimuli

(like U.I. 35+, Self-Reliance, and P.U.I. 1+, Torpor)

+39	Overestimation of length of fear periods
–35	Poorer immediate memory for words
+34	Higher self-sentiment (self-respect)
+32	Larger GSR deflection to threat
+31	More ataxic sway suggestibility
+30	Slower tempo of leg-circling
–28	Lower average handwriting pressure
–28	Poorer at addition
+27	Slower irregularly warned reaction time
+27	Larger size of myokinetic movement
+23	F+, Surgency
–23	M–, Praxernia or Practical Concern
+21	More involuntary muscle tension in right arm
+20	Less confident of skill in untried performance
+19	More long-circuitedness (life goals further off in time)
+19	Higher absolute level of GSR resistance

*The heavy test load on subjects did not permit the full list of questionnaire primaries to be used, but only A, C, F, H, I, M, O, Q_4.

**The factor titles always give the proper direction of relationship between the variable and the factor.

ing tendency to conform, to restrict the ego, to suppress, repress, and dissociate what does not fit the approved social ideal. We conclude that this conforming need or capacity to adopt the approved cultural behavior model, like U.I. 16 and 29, is too fixed a feature of personality to show fluctuation with adult circumstances.

Table 9–2 sets out the R3 study incremental factor patterns of greatest clinical relevance: U.I. 19—, 22—, 23—, 24, 28, and 35. It should be made explicit that "clinical relevance" is here understood primarily as (a) anxiety or neurotic-contributory by type definition (Chap. 3) or (b) anxiety-like or neurotic-like by trait definition (involving behaviors that look anxious or neurotic). The above trait definition can be applied just as readily to state factors as to their characterological inter-individual difference forms and, in fact, such definition can lean heavily on the resemblance of the former to the latter, which are already trait-defined as anxiety or neurosis. Here, the proposition that a state factor is clinically relevant in the type-defined sense is based on the similarity between this state factor and a characterological trait factor, with only the latter checked directly against clinical judgment. That is, we have not yet directly type-defined state factors by checking them against clinical judgments of changes in state or condition of neurosis or anxiety. The exception to this is the MR study, discussed later in this chapter, where U.I. 24 was type-defined as the anxiety state factor by means of direct checking against anxiety state evaluations by psychiatrists.

The last question to be asked to reach the clearest formulation of present conclusions on a taxonomy of states is: Do the patterns found by incremental R-technique agree with those found by P-technique analysis of individuals? That is to say, is the R-incremental pattern, as would be theoretically expected, an approach to the central tendency among the P-technique patterns? (See the theoretical considerations above about sampling people and sampling occasions, p. 155.) The experiments undertaken to answer this involve a very substantial amount of experimental work on states and justify first looking at the P-technique evidence in the section following.

State Patterns Recognizable by Replications Through P-Technique

Typically, in P-technique, some 40 to 60 measures are taken on one individual for 80 to 100 days, and the variables are intercorrelated over occasions and factored to yield the number and nature of independent patterns and dimensions of change required to account for all the fluctuations visible in that domain. Some uniform trend factors due to learning, boredom at repetition of the test situations used, seasonal trend,

TABLE 9–3

THE STATE PATTERNS AS SEEN IN THE CENTRAL TENDENCY IN EARLIER P-TECHNIQUE STUDIES (38)

Index No.	Description (Trait Index Number Given in Parentheses)
P.U.I. 1	*Unreactiveness (Torpor)* vs. *Sensitive, Overactive State (U.I. 35)* There are physiological indications that this may represent parasympathetic nervous system predominance, as opposed to excessive, catabolic action of the sympathetic system. Alternatively, it may be central inhibition. At the torpid pole are high skin resistance, large recovery (upward resistance drift after alarm) and high ataxia, and at the sensitive pole higher blood glucose, small capacity to react to GSR (small deflection) and high serum cholinesterase. Psychologically, the torpor is not low energy, for at this pole we find the happy-go-lucky surgency qualities and Praxernia (M-) with ratings of self-confident, out-going, friendly, and lusty in appetites. At the sensitive pole are ratings of shy, obstructive, unsure. Three hypotheses have initial promise: First, Low excitement vs. High excitement of the central nervous system. Second, High instinctual suppression vs. Easy reaction to instinctual stimuli. Third, Boldness or Dominance vs. Timidity and sensitivity of mood. As to the last, although appreciable correlations with H, Parmia (but not E, Dominance) have been found, an identity cannot be established. As to the first, the popular (and Wundtian) idea of a single dimension of excitement vs. absence of excitement is not too well borne out by these analyses. Both P.U.I. 1 and P.U.I. 2 show a quality of excitement or alertness. High excitement or alertness might be expected from several causes—pleasurable excitement (P.U.I. 2); fear and alarm (possibly P.U.I. 1-); poor self-control; general sympathetic system stimulation; absence of sleepiness, and so on. This suggests that any general excitation level would be a second-order factor among several primaries. It would be valuable to investigate the probability that P.U.I. 1 is the dimension along which alcohol produces its main shift, though against this hypothesis are the indications that the unreactiveness is one of deep inhibition against instinctual expression. At the negative pole one sees an almost febrile fussiness and even a jaded *overreactedness*, rather than excitement per se, as witness the loss of GSR deflection. The relation to parasympathetic predominance (at the P.U.I. 1+ pole) should also be investigated. There is an unmistakable resemblance to the incremental R-technique factor U.I. 35 (Table 9-2), but this favors the low excitement rather than the insensitive interpretation, for U.I. 35 is interpreted as a turning from direct instinctual excitations.
P.U.I. 2	*Happy Alertness* vs. *Depression and Frustrated-Emotionality (U.I. 22)* This is a well-defined factor, though the title may be too glib, for there is an indication of general frustration and *affectivity* at the depression pole, rather than pure depression. At the successful, elated pole, it loads short reaction time, quickly reversible perspective, high fluency, etc., and matches the incremental factor U.I. 22+, though the *Q* data (second-

TABLE 9-3 (cont.)

Index No.	Description (Trait Index Number Given in Parentheses)
	order) loadings are only clear on I– and N+. The depressive pole has the second highest loading of any factor on ketosteroid output (see Chap. 10). It is possible that the "happy alertness" state corresponds to the cortical state which Lindsley has called "high activation" (139).
P.U.I. 3	*Diurnal Fatigue* This is simply a daily fatigue factor loading time of day, increasing rapidity of reversible perspective, disproportionate increase in forewarned reaction time length, and big upward drift of skin resistance on relaxing. A complication needing discussion here is that it has some tendency, like P.U.I. 2–, to match U.I. 22–, and that P.U.I. 5 also has some similarity to U.I. 22–. Possibly, U.I. 22– will prove to be in a second-order behavior pattern common to depression, fatigue, and adrenergic responses, which can be separately measured.
P.U.I. 4	*Effort Stress (U.I. 26)* It is noteworthy that this physiological stress reaction can be clearly separated from the Anxiety response. It loads measures showing efforts at control and efficiency and matches the incremental and R-technique factor U.I. 26+, Self-Sentiment control. It has high loading on ketosteroid output. (See Chap. 10.) Five studies agree in placing high physiological stress with high emotional control and conscientious, high-striving performance, rather than with high emotionality and impulsiveness. However, external stresses naturally increase the response because they demand more control. Thus interview and exam stresses increase the response. In *Q* data its associations are with C+ and O– (Ego Strength and Confidence).
P.U.I. 5	*Adrenergic (Sympathetic Autonomic) Response* This has been noted in four P-techniques but no incremental R-technique study. It has some resemblance to U.I. 19–, which, however, also has some claim to P.U.I. 11. Its main loadings are physiological, though a number of "hypomanic" behavior responses with sociable and self-confident ratings also occur. Probably, this is negatively related to the vagatonia factor, P.U.I. 1; but it is definitely not the mere opposite of P.U.I. 11.
P.U.I. 6	This is a seasonal trend factor not relevant here.
P.U.I. 7	This is a basophil-neutrophil pattern not relevant here.
P.U.I. 8	*Good Mobilization* vs. *Overwroughtness and Regressiveness of Interests (U.I. 23)* This is a pattern recorded in two P-techniques and one incremental R-technique research and matches the trait pattern

TABLE 9–3 (cont.)

Index No.	Description (Trait Index Number Given in Parentheses)
	called Neural Reserves *vs.* Neurotic Debility, in languid self-sufficiency as against hectic social interests. It loads long hours of sleep the previous night, quick reaction, high endurance, high fluency, low rigidity, high ratio accuracy to accomplishment, less acceleration to competitive situations, etc. Consonant with the U.I. 23+ match, one comes to the conclusion that it is an inner security, coherence, and capacity to mobilize as opposed to overwrought, distracted, inaccurate reactions to many outside stimuli, along with indications of ergic regressions from adaptive interests.
P.U.I. 9	*Anxiety and High General Autonomic Activity (U.I. 24)*
	It is curious that only one of the ordinary P-technique studies, plus the stimulus controlled P-technique study, shows a pattern identifiable with U.I. 24, and especially with the R-incremental U.I. 24. In fact, there is some possibility of alternatively matching U.I. 24 with P.U.I. 11. The main loadings are high pulse pressure, acid saliva, low skin resistance, high estimated metabolic rate, poorer memorizing, higher ratio of emotional/non-emotional comment and recall. This pattern will not be enlarged on here, since it will be specially examined later.
P.U.I. 10–	*Increased Superego Demand* vs. *Less Rigid Superego (U.I. 28)*
	This dimension has so far been found in only one P-technique study but appears also in our incremental R-technique (Table 9-2). It loads low skin resistance; absence of fidgeting; small pupil diameter; questionnaire C–, F–, Q_4+, and ratings of resentful (*vs.* debonaire), more severely critical (test), and greater tendency to agree. However, this pattern has resemblances both to U.I. 28+ and , less clearly, to U.I. 20+, which require resolution. (Faint resemblance also to U.I. 29–.)
	At least the sense of U.I. 28+ and 20+ agree in indicating greater superego action and stronger moral awareness. Thus, this seems to be a dimension of change between a mood of greater and lesser guilt or superego action. As such it should be extremely important for the study of neurosis and deserves greater experimental definition.
P.U.I. 11–	*Promethean Will (Egoistic, Critical Mood)* vs. *Subduedness (Resigned, Cowed Mood)*
	The pattern appears in one P-technique and one incremental R-technique, loading good memory, high critical severity, little fluency in self-criticism, alkalinity of saliva, much increase in heart rate after startle, high pulse pressure, low skin resistance, and rapid rate of GSR conditioning. It can be tolerably matched with U.I. 19+. Metabolic rate and hyperthyroidism have been associated with it, the former experimentally. In

TABLE 9–3 (concluded)

Index No.	Description (Trait Index Number Given in Parentheses)
	ratings, it goes with excited *vs.* conscientious and accomodating, but the primaries in F (Q) IV, namely E+, Q_1+, N+, and F+- which should load here if the U.I. 19+ match is correct—have not been tested.
P.U.I. 12	*Cautious Mood (Inhibition or Timidity)* vs. *Careless Mood (U.I. 17)* This is listed last because it is not adequately defined as a P-technique factor but only as an R-incremental, loading poorer word memory, more speeding up of reaction by shock, more threatening objects seen, and greater length of warned/unwarned reaction time. It matches fairly well with U.I. 17+ which appears to be a largely constitutional factor of timidity, nevertheless, varying in level from day-to-day.

etc., usually also separate out; but these dimensions, irrelevant to our study of comparatively typical and universal response state patterns, can usually be recognized for what they are and set aside. (In the psychometrist's terms, they "partial themselves out" as separate factors.) In most studies, psychological and physiological variables are factored together, but except in so far as the latter help to prove the identity of some factors in doubt, all discussion of physiological associations is deferred to the next chapter. Also, some P-technique studies include manipulated stimuli as well as the usual response variables in the experimental records and the factor analysis. But, since our first and immediate concern is to recognize the number and nature of response patterns, intensive consideration of the associations with stimuli will be deferred to Chapter 11.

For general background, there exists an integrative summary of five P-technique studies (38) and, in addition, their original reports as separate experiments (55, 60, 113, 128, 221, 222). The five studies include separate studies on each of four normal adults and one clinical case, while a sixth study, the special Michael Reese research to be reviewed later in this chapter (MR, Appendix I), covers eight clinical cases. P-technique factors are indexed with the Universal Index prefixed by "P" (P.U.I. instead of U.I. as in R-technique indexing), and there are now some twelve P.U.I. factors listed (38) of which those seeming most relevant clinically in the study of malergic states are indicated by italics in Table 9–3.

Table 9–3 is intended simply to give a brief, semi-interpretive description of the twelve factors recognized as of 1955 in P-technique research, the actual loading replications for which can be studied elsewhere (38; 44, Chap. 15). Table 9–4 then gives more recent P-technique patterns from a new, stimulus-controlled, P-technique study (MR) which is described more fully in the next chapter and in Appendix I, but from which we have here abstracted the patterns relevant to a general matching. In Table 9–5 we simply organize and integrate the data from Tables 9–1, 9–2, 9–3, and 9–4, showing how we have matched and identified the same or similar state factors between two R-incremental studies (CQ2 and R3, Tables 9–1 and 9–2), the five basic P-technique studies (Table 9–3), and the recent stimulus-controlled P-technique (MR, Table 9–4). The matchings of patterns that have entered into our final conclusion may be judged from Table 9–5 and the discussion in the text. Finally, in Table 9–6, we have set out the best estimate we can make on present evidence as to the form of the response patterns matched and traced from as many as eight separate studies. This final picture is not reached by a mechanical adding of loadings, but by various allowances for sample sizes, reliabilities of measurement, etc., too subtle for brief description, but issuing in quantitative estimates because these are necessary to defining a pattern. Table 9–6, when we reach it, represents essentially the concepts about states with which we shall work in the rest of this book, and the clearest statement of present hypotheses from which the next steps in research can take off.

Further Evidence on P-Technique States in a Stimulus-Controlled Stress Interview Experiment

A very recent contribution to our information about states comes from the authors' joint study with Dr. Grinker and his associates, the stimulus-controlled P-technique study referred to above (see MR, Appendix I). Its fuller discussion particularly in regard to stimulus conditions and physiological variables is reserved for Chapters 10 and 11. Here we shall simply note the number and nature of psychological state factors found from the standpoint of contributing to the evidence for a complete taxonomy of states.

In the MR study, eight patients with diagnosis centering on depressive neurotic (see Appendix I) were each subjected to stress interviews of about thirty minutes at various times during five successive half-days (over a total period of two-and-one-half to three days). Thirty-four psychological, physiological, and rating measurements were made immediately before, during, and after the stress. The interview-induced stress (presence scored as 2; absence as 1) was correlated in the series. After bringing each patient's scores on any one response variable to the same common mean and sigma for all patients, thus eliminating inter-individual differences, the five successive measures on each variable for each of the eight patients were strung together into a chain series of forty. This was done in order to have a long enough series for a reasonably dependable correlation, and on the logic that since we are looking for what is common to human nature (in this case, neurotic-depressive human nature), we are interested only in the state response patterns which are common to all. The full rotated matrix, shown in Table 10–3, revealed eight factors, five of which will not be discussed here (namely, two mainly physiological, one uninterpretable, and two which are only very tentatively identified). The salient loadings are set out in Table 9–4 for the three factors in the MR or stimulus-controlled P-technique study, which are relevant to our present taxonomic aims.

First of all, blind simple structure rotation resulted in a factor pattern matching the standard objective test U.I. 24 pattern (from the R-incremental and the P-technique researches) correct in sign for all previously known marker variables and loaded at the top with a composite total U.I. 24 factor score as shown in Table 9–4. The symptom checklist and the tendency to agree U.I. 24 marker loadings were very low, however. Factor 1(F1) also matches the P-technique factor representing Anxiety, P.U.I. 9. F1 has no correlation with the stress interview and it seems that in these neurotics, the course of U.I. 24 is decided by life situation influences more subtle than a stress interview. The stress interview actually loaded substantially two factors in the whole series, F3, which seems to be a general affect or frustration response factor (finally interpreted as Pathemia, U.I. 22—) and F2 which has some claim to being a second anxiety factor, but is more likely an Effort Stress (P.U.I. 4) from attempts to control anxiety, etc.

F3 (Table 9–4) is loaded +.43 by presence of interview stress and accounts for most of the variance in total rated affect, namely, anger, depression, and some anxiety. We believe this factor has more total variance than it should, by reason of the raters *expecting* more affect when "the heat was turned on" in a stress interview, then seeing it. At any rate, it is clear that the interview stress grilling evoked a dimension of change quite distinct from the main anxiety pattern, U.I. 24, and from the pattern we have called Effort Stress. This F3 pattern is characterized by high rated affect, with a predominance of the emotion resulting from frustration—primarily depression, with some anger and confusion. We perceive at once a considerable resemblance to the conception involved in the negative pole of R-technique factor U.I. 22, called Pathemia, where we found a predominance of feeling at the cost of clear cognitive functioning. We hypothesize that F3 here is similar, involving a combination of frustration-without-outlet-for-aggression, depression, anger, confused thinking, and retardation. For this, there

TABLE 9–4

General Anxiety (U.I. 24). Pathemia and Effort Stress Patterns in the Controlled-Stimulus P-technique Experiment

(MR Study, Appendix I)

Factor 1—General Anxiety (P.U.I. 9)

Total Anxiety factor score (composite score from all previously known Anxiety trait markers in this battery)	.72
High willingness to admit common faults	.58
High susceptibility to annoyance	.46
Fast rate of respiration	.45
High plasma 17-OH in blood	.43
High level of Anxiety (questionnaire responses only)	.37
Faster heart rate	.30
Much lack of confidence in skill in untried performances	.22
High level of psychiatrically-evaluated anxiety	.20

Factor 2—Effort Stress (P.U.I. 4)

More anxiety-tension symptoms in self-checklist	.64
High level of Anxiety (questionnaire responses only)	.47
More plasma 17-OH in blood	.47
Presence of interview stress	.45
Faster heart rate	.39
More pronounced tendency to agree	.37
Total Anxiety factor score	.26
Less susceptibility to embarrassment	−.25
More psychiatrically-evaluated anger	.23

Factor 3—Pathemia vs. Corticalertia (P.U.I. 2)

High level of psychiatrically-evaluated total affect	.69
High level of psychiatrically-evaluated depression	.67
High level of psychiatrically-evaluated anger	.55
High level of Anxiety (from questionnaire responses)	.44
Presence of interview stress	.43
Less susceptibility to annoyance	−.39

is no specific well-known term, although resentment with affectivity may be near to it. Unfortunately, the MR study lacked sufficient markers for confident identification with Pathemia (U.I. 22—), but we shall tentatively conclude that this is the match for it.

The third of the psychologically involved MR factors, F2, is one of two substantially provoked by the interview stress situation. (It has an r of +.45 therewith, close to that for Pathemia.) The dilemma we face here is that, in all other aspects, it could almost as well be called anxiety as can F1. However, F2's anxiety is expressed in the questionnaire responses and especially those pleading symptoms, while in the objective test measures of anxiety it is far poorer than F1 and in one case, high "susceptibility to embarrassment," it is actually opposed in sign. Therefore, although F1 and F2 have some common character and are cooperative, a perspective across several studies suggests that only F1 is really the general U.I. 24 anxiety factor we have recognized previously (Chap. 5 and Table 9–2) and that some title such as "stress anxiety" or even "fear" or "alarm" should be given to F2, implying that it is a short-term, immediate response to stress, concretely present. Several features of F2, notably the high corticosteroid output, suggest a stress response interpretation. With the anxious depressive patients in MR, the stress happens to be colored with anxiety and we hypothesize that this is because the stress response is induced by the effort to control anxiety. But we believe that essentially the same stress pattern would appear in any effort-control situation, perhaps with different coloration depending on the phenomenon calling forth the need to control. That is, it makes sense to consider F2 as a general, immediate response to any concrete stress situation which requires self-control and defensive action. In this connection it is noteworthy that one of the chief distinctions between F1 and F2 is that F2 is loaded by rated anger but not anxiety, whereas F1, the classical U.I. 24, has higher observer rating in anxiety than in anger. Also, we find an additional argument, from the negative correlation existing between these cooperative factors (—.26), that they are to some degree alternatives and substitutes, and this points perhaps to a conscious effort in the F2 stress pattern to control anxiety (F1), so that stress actually mounts as anxiety falls.

In the future, more markers must be tactically introduced to settle this intriguing question, but meanwhile we shall hypothesize that the higher symptom checklist (conscious anxiety) scores on F2 simply represent a heightened awareness of what is being controlled when control is exercised. We shall hypothesize that F2 is essentially a factor of stress through control, in this case control of anxiety and, as such, is a special case of a general response pattern which we shall call Effort Stress, since the effort may be either against the environment or in self-control. This stress pattern in the MR study is thus tentatively hypothesized to be the same as the stress pattern, P.U.I. 4 (Table 9–3), which it resembles in presence of will control in face of an external stress and in high 17-OH in the blood. Whether this is identical with the first alarm stage of the General Adaptation Syndrome as described by Selye (199, 200) remains to be seen. There are decided resemblances, yet we are inclined to believe that the Selye pattern is a broader affair, varying somewhat as Mefferd has shown (157), with the nature of the stress (an interview, effort, oxygen lack, cold, an infection). Later

TABLE 9-5

The Nature of the Matchings Made Among Contributory Studies to State Factor Definition

The Characterological Trait Factor in Objective Test and Questionnaire Measures. (Chapters 4 and 5)	*Confirmed and Matched as State Factor in Questionnaire Data* (CQ2 and R3; Tables 9-1 and 9-2)	*Confirmed and Matched as State Factor in Objective Test Data*			*Brief Title for State in Malergic Direction*
		R3 Incremental Study (Table 9-2) and Full Data on Original Study (65, 70)	*MR* Stimulus-Controlled P-technique (Tables 10-3 and 9-4)	*P-Technique* 5 Basic Researches (Table 9-3)	
Anxiety—U.I. 24 and F(Q)II	Well Confirmed	Yes, F1, Table 9-2	F1, Table 9-4	P.U.I. 9	Anxiety
Pathemia—U.I. 22– and F(Q)III	Confirmed in CQ2	Yes, F4, Table 9-2	F3, Table 9-4	P.U.I. 2	Pathemia
Invia or Introversion—U.I. 32 and F(Q)I	Confirmed in CQ2	Not Present	Not Present	None	Invia
Resignation—U.I. 19– and F(Q)IV–	Fairly Well Confirmed in CQ2	Yes, F5, Table 9-2	Not Present	P.U.I. 11	Subduedness
Rigid Superego—U.I. 28	No Questionnaire match possible except M, Autia, for U.I. 34	Yes, F3, Table 9-2	Not Present	P.U.I. 10–	Guilt
Neurotic Regressive Debility—U.I. 23–		Yes, F2, Table 9-2	Possibly, F8, Table 10-3	P.U.I. 8–	Regression
Long-Circuited Dynamics—U.I. 35		Yes, F6, Table 9-2	Not Present	P.U.I. 1	Torpor
Self-Sentiment Development—U.I. 36		F9 in original study (65)	Not Present	Possibly, P.U.I. 6,	Strong Self-Sentiment
Inhibition—U.I. 17		F6 in original study (65)	Not Present	Possibly, P.U.I. 12	Inhibition
Narcistic Self-Will—U.I. 26		F11 in original study (65)	F2, Table 9-4	P.U.I. 4	Effort Stress
Autia—U.I. 34		F4 in original study (65)	F6, Table 10-3		Relaxation (Autia)
Apathy-Fatigue—U.I. 27		F7 in original study (65)			Apathy
			Possibly, F4, Table 10-3	P.U.I. 5	Adrenergic Activity
			Possibly, F5, Table 10-3	P.U.I. 3	Diurnal Fatigue
				P.U.I. 7	Basophil-Neutrophil Pattern

we shall present some evidence which suggests that the G.A.S. is a broader second-order factor, in which there is some latitude to the role of the different primaries, according to the nature of the situation (see Chap. 10).

An alternative view of F1 and F2, brought out by the MR study, is that they correspond to the difference between "angst" and "furcht" as elaborated by Freud. However, we reject this because P.U.I. 4, though admittedly a reaction to an immediately threatening situation, is in some of our instances definitely not fear, but strong effort. If fear is sometimes involved, it is a secondary pattern (probably triggering the P.U.I. 5, Adrenergic response, primarily) and the feature common to it and the other situations is effort at control or adaptation.

Setting of Anxiety, Stress, and Neurotic States in Principal Dimensions of Psychological State Change

Our aim in this chapter has been to consider Anxiety, stress, Pathemia, and other neurotic state phases in the perspective of the totality of state changes and in terms of an adequate methodology. The number of dimensions of malergic change in physiological, introspective, and behavioral measures, of which our various experiments give some evidence, is quite large. Of these, we have sufficient replication to be reasonably confident of the existence of those dimensions listed in Tables 9–5 and 9–6. Table 9–5 summarizes the matchings across media of measurement and between various trait and state studies, while Table 9–6 gives an average estimate to date on the nature of the most important malergic dimensions, in terms of their highest loading variables.

There is much research to be done in pursuing, conceiving more clearly, and attempting to replicate the patterns appearing in only one research; but only the replicated factors in Tables 9–5 and 9–6 can be discussed at present as our universe of known psychological state changes. It is not our purpose to classify these exhaustively, but some are obviously malergies, in the sense that they represent, at one or both poles, a falling off from a normal state of efficiency or introspected normality; others are moods, defined as changes in dynamic need factors, and others are sensitivities or states of effort at adjustment, etc., for which no general classification terms exist now.

The technical task of setting out conclusions on matching of factors and on the inferred factor loadings for the composite mean pattern derived from such matching, in a way to satisfy all statisticians, is at present almost impossible. A common approach in establishing identity across research is to determine the similarity of loading patterns by correlating them. There is reason to believe that sampling and measurement errors in factor analysis affect the magnitude and rank order of significantly loaded variables (the salient variables) a good deal; but also that, so long as the factor is truly the same, the same variables tend at least to be out of the hyperplane together (salients) or in it together (essentially zero in loading). On this argument, Cattell and Baggaley (49) developed a non-parametric "salient variable similarity index," which has been used in various matching processes involved here. However, the test of significant matching has today to depend on more than a single index, and the whole procedure is discussed in more detail elsewhere (49).

The consolidation of the gains made here and, especially, a tight statistical proof of the matchings (and therefore of the total number of dimensions needed to describe psychological state change) requires: (i) At least one and preferably three or four more independent incremental R-technique studies, with choice of key variables guided by the results in this chapter, to fix the best markers and to check matching of incremental-R with P-technique factors. (ii) A definitive master study in the P-technique area to amplify the descriptive variables in relation to known stimuli and to check hypotheses about the nature of these factors. (iii) A mathematical-statistical development in regard to matching across R-incremental and P-technique studies. The matchings in Table 9–5 lack these refinements but have nevertheless been carried out with care and with comprehensiveness of reference. Once we have glimpsed that which is common to the major state patterns, regardless of differences in the medium or methodology of measurement which governs their appearance in a given study, we can go on to estimate average patterns for each state pattern. Table 9–6 does this, presenting conclusions which have the highest likelihood of depicting real structure in the light of the evidence available and which are in form for definitive checking studies.

The only states well-replicated in P-technique which lack any match to characterological trait dimensions are the general diurnal fatigue factor P.U.I. 3, P.U.I. 5, P.U.I. 7, and possibly the seasonal trend factor P.U.I. 6, which, however, does seem to have some of the same vigor variables as the self-sentiment factor, U.I. 36. One remaining difficulty is that the alertness of the U.I. 22 pattern has test resemblances to both elation (P.U.I. 2) and freedom from fatigue (P.U.I. 3—), which may mean, ultimately, a split of U.I. 22 in its state aspect. Fatigue, P.U.I. 3, is undoubtedly important clinically and in research, and more care should be used to partial it out from factor expressions with which it is easily confused; but we shall say no more about it here, after pointing out its independence from other malergic state dimensions.

From the standpoint of the known framework of trait dimensions, U.I. 1, 16, 18, 20, 21, 25, 29, 30, 31, and 33, have as yet shown no evidence of a state equivalent; that is, they do not show clear fluctuation over time. Thus, only three or four of the top ten or eleven neurotic-contributory trait factors fail to show a state form (U.I. 1, 16, 21, 29). The number of clinically relevant dimensions is thus not quite so large in states as in traits, but it is still large enough to make ridiculous any talk about a single neurotic mood. In the clinically relevant realm there are moods and more moods, each functionally distinct from the other, with a complexity of determination approaching that of characterological traits. Therefore, as with traits, we need some simplifying, organizing principle analogous to that of neurotic process. Accordingly, in subsequent discussion, we will concentrate on a relatively limited number of state dimensions, on the grounds that they are among the best-confirmed dimensions and most relevant clinically. These six neurotic phase factors include the state forms of four important neurotic-contributory trait factors—Anxiety, Pathemia, Subduedness, and Regressive Debility—and also two dimensions that are known best in their state forms—Effort Stress and Torpor.[4] We hypothesize that these neurotic phase dimensions, when high, could place a person temporarily in the neurotic pattern, if and as they act in conjunction with more fixed neurotic-contributory characterological factors already at the neurotic level (U.I. 16−, 29−, 1−, 21−, 32+).

As a nucleus for theoretical discussion and further steps in research, Table 9–6 sets out the best estimate of all thirteen of the matchable factors from Table 9–5, leaving out only P.U.I. 3, P.U.I. 7, and some less well-established factors beyond P.U.I. 12 from the total list of sixteen P-technique factors believed to be demonstrated. Researchers collating contributory researches should note that Table 9–6 fixes state interpretive titles to which we shall hereafter consistently adhere, until some major discovery suggests re-interpretation. In the original researches and discussions up to this point, some of the P.U.I. factors were picked up at the opposite pole from that labeled positive for corresponding U.I. factors. Accordingly, we have taken this opportunity to reverse the signs (relative to the research data) of some P-technique factors so that henceforth they will score positively in the same direction as their U.I. counterparts have always been measured.

While the variables defining the state factors above are not exhaustive, notably, in that the physiological variables are only representative (see Chap. 10), they include all psychological variables when the loading or the replication indicates a lead of high confidence. The state factors of lesser confidence in pattern come toward the end of the table, in the pattern of Relaxed Autia (U.I. 34), Strong Superego (P.U.I.

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[4] The index numbers for these factors are: U.I. 24 and P.U.I. 9; U.I. 22 and P.U.I. 2; U.I. 19 and P.U.I. 11; U.I. 23 and P.U.I. 8; P.U.I. 4; P.U.I. 1.

TABLE 9–6

BEST PRESENT ESTIMATE OF LOADING ORDER OF SALIENTS ON THE THIRTEEN MOST IMPORTANT STATE DIMENSIONS

State Title (Given First at Positive Pole) & Index	*Variables Saliently Loading the State (Given at the Pole)*
Anxiety P.U.I. 9, U.I. 24, and F(Q)II	Higher willingness to admit common failings; higher susceptibility to annoyance; C– or Lower Ego Strength (*Q* primary); lesser confidence in untried performance; higher systolic pulse pressure; Q_3– or lower Self-Sentiment (*Q* primary); Q_4 or higher Ergic Tension (*Q* primary); higher metabolic rate; higher 17-OH ketosteroid excretion; poorer deliberate memorizing; faster respiration; less persistence in unrewarding situations; lower electrical skin resistance; greater emotionality of comment; faster pulse; lowered alkalinity of saliva; Q_2 or more Self-Sufficiency (*Q* primary); O+ or more Guilt Proneness (*Q* primary); lower mean handwriting pressure; M+ or more Autia (*Q* primary); higher ratio emotional/non-emotional recall.
Effort Stress vs. *Repose* P.U.I. 4 and U.I. 26+	More powerful effort on concentration (increase in goodness of memorizing); more powerful effort at control (lower rigidity and fewer circles in CMS test); increase in 17-OH corticosteroids in urine, presence of external stress, demanding adaptations; more effort (as persistence in unrewarding situations); lower fluency (verbal test); smaller size of myokinetic movement; overestimation of length of fear periods; smaller size of GSR deflections; more anxiety-tension symptoms reported; possibly, lower systolic and diastolic blood pressure; faster heart rate, greater number of threatening objects seen in unstructured drawings.
Pathemia vs. *Corticalertia (Depression* vs. *Elation, roughly).* P.U.I. 2, U.I. 22 and F(Q)III	Much longer reaction time (simple); slower rate of reversible perspective; more introspectively-reported depression and disturbance; more rated affect (disturbance) by observers; poorer ability deliberately to commit to memory; small amount of GSR conditioning; presence of situational frustration and I+ or greater Premsia (*Q* primary); more readiness to admit common failings; N– or greater naivete (*Q* primary), lower cholinesterase in blood serum; higher fear of accidents and disease (objective dynamic measures); reduced fluency, total; reduced fluency on self, relative to total; slower large body movement tempo; lower body temperature; lesser concern with detail in tests; A+, or more Cyclothymia (Q primary) ; lesser susceptibility to annoyance; fewer errors in complex reaction time situations; lower level of (involuntary) muscle tension (in right arm); less hand tremor.
Invia vs. *Exvia* F(Q)I	In declining order, *Q* primaries: Q_2, A–, M, O–, F–, Q_1 and H–.
Torpor vs. *Excitation* P.U.I. 1 and U.I. 35	Larger magnitude of GSR deflection per cent, high ataxic sway suggestibility, tendency to overestimate fear periods, higher level of electrical skin resistance, poorer deliberate, immediate memorizing, higher self sentiment (objective dynamic measures); high ratio emotional/non-emotional recall; lower glucose in blood serum; greater upward drift of skin resistance in relaxation; slower tempo (large body movements) leg circling; lower handwriting pressure; lower general muscle tension (myocardiograph);

TABLE 9-6 (cont.)

State Title (Given First at Positive Pole) & Index	*Variables Saliently Loading the State (Given at the Pole)*
	lesser speed and accuracy in addition, subtraction, etc.; tendency to lengthy description of dreams; lower cholinesterase in blood serum; shorter duration of negative after-images (optic); F+ or more Surgency (*Q* primary); M− or more Praxernia (*Q* primary); lesser tendency to consider experiences embarrassing; lesser confidence in untried performances; high tendency to agree; higher excretion of urea; lower pulse rate.
Regression vs. *Mobilization* P.U.I. 8 and U.I. 23	Slower reaction time, especially unwarned; sense of failure of memory in recalling dreams and stories; lesser endurance on ergograph; fewer hours of sleep reported preceding night; greater acceleration on entering competitive situation; low speed in writing and multiplying; lower fluency; higher rating of funniness of, and immoderate laughter at, jokes; rated more anxious by observers; later hour of day; C− or low Ego Strength; higher emotionality of comment; lesser tendency to agree; higher trapezius and quadriceps muscle tension (myocardiograph); higher annoyability. Smaller size of myokinesis; higher heart rate variability (sigma); higher affect rating by observers.
Promethean Will vs. *Subduedness or Resignation* P.U.I. 11−, U.I. 19+ and F(Q)IV+	Slower ideomotor speed; better immediate memory for words; E+ or more Dominance (*Q* primary); lower rating for "accommodating;" more increase of heart rate after startle; less performance decrement due to disturbing sound distraction; less distraction from work by esthetic material; greater amount and rate of GSR conditioning; O− or less Guilt Proneness (*Q* primary); lower rating "conscientious;" more critical severity of judgment; less fluency in self-criticism; N+ or more Shrewdness (*Q* primary); greater number of anxiety-tension symptoms; higher systolic blood pressure; lower level of skin resistance.
Strong Superego Guilt vs. Casual Mood P.U.I. 10− and U.I. 28	Lower electrical skin resistance; lower critical frequency of flicker fusion; more critically severe; more tendency to agree; more fluent about own than others characteristics; low ratio emotional/non-emotional recall; more slanting lines (eagerness) on CMS; less pupil dilation at stress; readiness to suffer more strong electric shock; lower sex drive; Q_4+ or higher general Ergic Tension (*Q* primary); higher level of involuntary muscle tension (right arm).
High General Inhibition vs. *Lack of Timidity* P.U.I. 12 and U.I. 17 (Resemblance also to P.U.I. 2 at depressive pole.)	Reaction time relatively faster in shock conditions; more threatening objects seen in unstructured pictures; more increase of heart rate after startle; lower ratio of unwarned/warned reaction time; poorer immediate memory for words; more persistence in unrewarding situations.

TABLE 9–6 (concluded)

State Title (Given First at Positive Pole) & Index	*Variables Saliently Loading the State (Given at the Pole)*
Apathy vs. *Zealous Mood* U.I. 27	More circle (short-cuts) used on CMS test; much ataxic sway suggestibility; less investment in self-sentiment (objective dynamic test); fewer slanting lines on CMS test; less reluctance to enter fear situation; more confident of untried skills; lower index of carefulness; preference for stronger smells; F− or Desurgenc (*Q* primary); lower systolic blood pressure; slower tempo, large body movements.
Assured Self-Regard vs. *Sense of Inadequacy* U.I. 36 and, possibly, P.U.I. 6	Larger GSR deflection; small recovery of GSR after shock; O− or higher Confidence and freedom from guilt (*Q* primary); more distraction by esthetic material; less ability to do problems in one's head; stronger interest in self-sentiment (objective dynamic tests); more careful in observation; less verbal fluency, especially in self-criticism; lower systolic blood pressure; preference for stronger smells; fewer circles used in CMS; lowe lymphocyte count; lower serum calcium.
Adrenergic Response P.U.I. 5 (This is included for completeness though the variables known to be affected are largely physiological and are studied as such in Chapter 10)	Higher glucose in blood; higher per cent lymphocytes; higher blood pressure; poorer deliberate memorizing; more slanting lines on CMS test; more circles used on CMS test; higher erythrocyte count; tendency to describe dreams lengthily; smaller difference (lag) in up and down flicker fusion thresholds; more rapid pulse.
Relaxed Autia vs. *Concern for Standards* U.I. 34	Lower ratio accuracy to accomplishment; larger size of myokinesis; relatively, prefers strange to familiar things; preference for stronger smells; less fidgeting (fidgetometer); larger GSR deflections; lower systolic blood pressure; relativel less fluent in self-criticism; fewer figures added correctly; more persistence in unrewarding situations; M+, or more Autia (*Q* primary); lower amplitude of hand tremor; less careful in observation; A− or more Schizothymia (*Q* primary).

10, U.I. 28), and Assured Self-Regard (P.U.I. 6, U.I. 36). The first has the M questionnaire factor substantially involved in it and seems to represent a mood of insulation from the external world and a predominance of narcistic interests (including introspection) as opposed to a mood of practical concern and involvement in the behavior standards demanded by society. Strong Superego (P.U.I. 10) might, in verbal currency, be confused with Autia, but the emphasis on standards is here on inner standards. At present, it makes a very adequate explanation that this represents guilt or, in lesser degree, a more active role of the superego, as opposed to a casual id-predominant mood. This is of such theoretical interest that its definition should be pursued, in order that the causes of swings toward contriteness and compunction may be experimentally investigated. Assured Self-Regard (U.I. 36) is the least well-defined, but seems to be an axis from self-confident, self-regard to a feeling of inadequacy and inability to cope. The oddity at present is that the pattern corresponds with that we had found in the swing to hot weather! Possibly hot weather inability to cope *does* produce secondarily a psychological loss of morale and self-regard.

Little discussion of other dimensions is necessary, since our hypotheses have already been brought out in the development of evidence. Anxiety, Invia,* Effort Stress, Adrenergic response, general Inhibition, and Apathy are thus clear enough, but a few words should be said about research questions on P.U.I. 1—Torpor, P.U.I. 8—Mobilization, and P.U.I. 11—Promethean Will. Our hypotheses about the first are: first, that it is a parasympathetic predominance and, second, that it is a cortical inhibition or withdrawal akin to a schizophrenic refusal to interact. The difficulty with the first hypothesis is that P.U.I. 1-U.I. 35 is probably associated with neuroticism in a way that has never been alleged for parasympathetic predominance. The difficulties with the second hypothesis are that the withdrawal is more sleepiness than unsociability, that operational clarity of the schizophrenic hypothesis is ow, and that so much of the physiology looks like exclusion of sympathetic reactivity and parasympathetic predominance. A third possibility is that the individual running high on this dimension has accepted more long-circuited, remote goals with current inhibition of simple ergic responsiveness, and that the neuroticism association is a secondary consequence of this striving for remote goals. In that case "restriction of id satisfactions" would be a better title than "torpor," for this would be nothing but the "torpor" of Archimedes deep in mathematical thought, or Socrates immune to the popular excitements of his day. Regardless of its lack of previous recognition by clinical psychology, P.U.I. 1, Torpor, is our largest and best replicated state factor and, empirically, as solid a reference point as the Rock of Gibraltar.

P.U.I. 8, Mobilization, is an intriguing mood dimension. All the behavior indicates good mental organization, reality-orientation, and a state of being braced and ready to cope. But it is not alarm, and it may not be greater ego strength per se. We should entertain a second hypothesis to that of good ego organization, namely, that it represents an ergic property, freedom from regressiveness in the Freudian sense which permits, among other things, greater ego strength. Incidentally, t shows some decline with hour of day, though not as clearly as does

Diurnal Fatigue, which suggests that Regression may be linked physiologically with a second concept of fatigue.

P.U.I. 11 has been allowed to carry over from U.I. 19 the title, Promethean Will, because this reference to myth does, after all, convey the quality of behavior better than anything but a long string of descriptive adjectives. The subduedness, at the opposite pole, has almost the quality of religious resignation. The person is aware of his unworthiness and has given up the struggle for personal assertion. In so doing he is more submissive and subdued but less guilty and tense.

Finally, we should note the peculiarity of the P.U.I. 2 dimension which has caused us to call it Corticalertia *vs.* Pathemia, instead of Elation *vs.* Depression. The good alignment with the characterological trait of Corticalertia, U.I. 22, favors alertness rather than the associations of a manic elation, while the depressive pole shows not only depression but high affect in the sense of affect through frustration or even the emotional daydreaming of a person failing in ego expression. Pathemia—a retreat to emotionality—therefore seems to be a better title than simple depression. However, later research may pull out from P.U.I. 2 some simple component of elation-depression.

If space permitted, much could be generalized from these data, regarding the modification of factor pattern from trait to state. Obviously, some real change of pattern, more than that due to sampling, is to be expected, for some characteristics will tend to become associated with a long-maintained state level, as causes or consequences which will show no association in a temporary state. And, conversely, some things can change temporarily, e.g., respiration rate, which are unlikely to be indefinitely maintained even if other aspects of the state remain. Only in the case of our most centrally important state shall we comment on these.

Anxiety as a state loads Ego Weakness (C—), Low Will Control (Q_3—), and Ergic Tension (Q_4) about as highly in the state as in the trait, but O, Guilt Proneness, L, Protension, H—, Timidity, and (possibly) M, Autia, fall from ten to thirty points from state to trait. In the main, this alignment corresponds to the known greater genetic composition of H and the greater environmental determination of C, Q_3 and Q_4 (52, p. 144). There is, further, a significant presence of Q_2 in the state but not the trait. In objective tests, the characterological dimension is loaded by small physical size which, of course, cannot appear substantially in the state. Also, susceptibility to embarrassment and tendency to agree do not load the state nearly so highly as the trait. We do not know if the latter two are more constitutional, dispositional elements in the trait pattern or are for other reasons less bound up with changes in anxiety than are annoyability or lack of confidence in performance. Conversely, we find present in the state, but not the trait (to any appreciable degree) high respiration rate, high systolic blood pressure and low galvanic skin resistance. These suggest that with prolongation of an emotional state into a characterological trait there is some homeostatic return toward normal of certain response elements. All in all, the state-trait differences which can be counted upon as systematic are such as one would expect from existing principles, both in the psychological and the physiological area.

Summary

1. A psychological state is recognizable by a set of variables which alter together, rising and falling over time, independently of other states. Such a response pattern may be triggered by various stimuli, but, methodologically, it is necessary first to establish its unity and nature as a *pattern of response*, and *later* relate it to stimuli. Thus, we define anxiety, neurotic, and other stimulus situations by means of the nature of the response patterns they provoke, not by a priori analysis of the nature of the stimuli per se.

2. The available techniques for analyzing independent response patterns depend upon correlating and factoring scores of change-over-time and consist of (a) P-technique, factoring one person's response trends over many occasions, (b) Incremental R-technique, factoring many persons' changes over one interval, and (c) stimulus-controlled P-technique which combines measurement of responses with measurement of manipulated stimuli and, in the study reported here, strings out several P-technique score distributions in a single chain series. These techniques should theoretically converge on the same end-result in terms of common human patterns of state change.

3. The methodologically exact study of states is recent, and results are therefore tentative. But a number of patterns have now appeared from experiment, fifteen or sixteen of which can be considered reasonably well replicated. Data from replicated P-technique, Incremental-R-technique (second-order questionnaire and T primaries), and stimulus-controlled, P-technique studies are set out tabularly so that the degree of matching achieved may be evaluated. Apart from three largely physiological factors, thirteen dimensions of state change are finally set out as a basis for theoretical development and research guidance.

4. Among the total dimensions of change, some may be selected as *malergies,* defining, at one or both poles, a state of lapse from a normal condition of adjustment, of introspected satisfaction, or of effectiveness of performance. The neurotic states are a sub-set within malergies, the most clinically relevant of which we have called neurotic phase factors. Of the trait dimensions significantly associated with neurosis,

at least five or six do not have corresponding state dimensions. Consequently, unless characterological dimensions also contribute concurrently to the neurotic profile, a person whose states are in a neurotic phase may still not be neurotic as defined by the total type profile.

5. The neurotic phase states are Anxiety, Pathemia, Subduedness, Regression, Torpor, and Effort Stress, the first four of which are known to be importantly neurotic-contributory in their characterological trait forms. Some other malergies such as Diurnal Fatigue, Adrenergic Response, and Apathy have either a negligible or unknown type-definition relation to neuroticism.

6. The state patterns differ slightly, but probably systematically, from their corresponding trait-loading patterns. This can be exemplified by Anxiety, in which small body build, which correlates in the trait pattern, obviously cannot load the state, while respiration rate and systolic blood pressure, which markedly load the state, load the trait very slightly. There are also differences in psychological measures in that "tendency to agree" and "tendency to embarrassment" load the trait more, as also do the more constitutional questionnaire primaries of Threctia (H—), Guilt Proneness (O), etc.

7. Nevertheless, the evidence is clear that Anxiety is a single factor as a state, closely corresponding to the single factor found as a trait. It is therefore possible, by applying a discriminant function analysis on these variables, to separate a characterologically high group from a temporary high state group and to weight the measures to produce a maximum distinction of state and trait. Thus, even without retesting, one might assign separate scores on state and trait level. Anxiety level may thus be measured as a state, but the level of neurosis state is a more elusive concept. It requires measurement on a weighted set of factors and logically is still a measure of neurotic phase level, not of total neurosis, since the latter can also be contributed to by characterological factors which have no known state expressions.

8. The distinction of the state of Anxiety from a state of stress, is probably as important as the distinction of Anxiety from neuroticism, in terms of current conceptual obscurities.

9. Many physiological variables have been listed in connection with the distinction and definition of psychological states, but systematic discussion of the meaning of physiological associations has been deferred to the next chapter.

CHAPTER 10

SOMATIC AND PHYSIOLOGICAL INTERACTIONS IN ANXIETY AND NEUROSIS

Methodological Refinements Needed for Integrating Psychophysiological Research Findings

If anyone needs to be convinced of the complex and baffling causal intimacy of psychological and physiological factors in disease, he has only to look at the breadth of the no-man's-land across which psychotherapist and medical man battle with radically alternative theoretical explanations and quite conflicting specific case diagnoses. In one decade, 90 per cent of therapists may be convinced that psychoanalytic treatment of a narcistic instinctual regression is the answer to schizophrenia. In the next, 90 per cent are equally ready to conclude that a (possibly inborn) error of metabolism, producing a lysergic acid-like substance, is the root of the trouble. Scarcely less extreme emphases can be found in accounts of the etiology of the neuroses with which we are here concerned.

Closer concentration on the evidence brings out the alarming fact that this shifting perspective in the observers is due, partly, at least, to something more than the subtlety and confusion of interaction in the features they study. The earth itself moves—that is, the actual rates of incidence of various forms of physical disorder and associated mental disorder change from place to place and generation to generation. If our impressions are correct, true psychosomatic disorders, such as certain forms of peptic ulcer, colitis, hypertension, etc., have been steeply on the increase, while conversion hysteria, with its merely "apparent" paralyses, sensory defects, etc., is becoming increasingly rare. Possibly, an increasing sophistication of the general public, making some of the hysteric sham reactions more transparent and less socially permissible—as well as an increasing educational emphasis on development of personality integration—have caused the "imaginary" physical ailments to decrease, while a real somatic wear-and-tear, perhaps based on higher standards of control and performance, has taken their place.

The present research findings on 16 P.F. profiles of syndrome groups (Chap. 7) show that hysterics and psychosomatics show great pattern difference. This is in accordance with our personality factoring of physical symptoms in normals and the excellent parallel study in abnormals by Huffman (footnote 1, p. 40). Both of these show physical symptoms essentially separated into two factors: I+, Premsia, the overprotectiveness which acts as a main component in the hysteria etiology, and J+, Coasthenia, representing an exhaustion picture from effort and rigid superego development and constituting perhaps the major influence in the psychosomatic syndrome. (Additionally, straight hypochondria occurs in C— and F—.) There is a fairly clear differentiation in the physical symptoms in these two factors. Premsia loadings (I+ factor) include ratings of use made of physical symptoms, cardiovascular symptoms, gastric symptoms (vague pains and vomiting, not ulcers), and headache complaints. The Coasthenia or J+ factor associations are more frequently real organic damage, skin symptoms, and respiratory complaints, possibly indicating endocrine upsets (44, pp. 131–140). Some clinicians still fail to make a clear distinction between these two classes of physical disorder and, indeed, on clinical grounds the arguments and evidence are not conclusive. But the factor-analytic approach definitely calls for separating a class of hysteroid physical disorders, initially largely functional, and showing particularly in heart symptoms, hysterical vomiting, headaches, disorders of sensation, etc., and a group of disorders in which real physical damage (possibly initially only in terms of endocrine malfunction) is evident. Obviously there is some overlap when hysterical disorders are of long standing, but even then there is a difference of etiology. The distinction is drawn here to make it clear that the present chapter is concerned with genuine organic changes and objectively measurable biochemical phenomena related to neuroses, not with the hysteroid conditions which exist only at the level of the patient's perception and demonstrate artificiality by cutting across well-known organic lines of functioning.

The field to which we limit ourselves needs also to be limited on another flank. We shall omit and defer to the following chapter consideration of the social and educational trends briefly mentioned above. However, the reference to historical changes in neurotic symptomatology, notably in the area which we are now considering, is introduced to point up the full complexity of the relationship. With this introduction, we plan to set aside from discussion the conversion hysteria phenomena; to start with a clear appreciation of how labile the expressions of disorder can be with various slight changes of physical and mental environment; and, especially, to justify to the reader, by stressing the high incidence of these forms of disorder, this extensive chapter devoted wholly to physiological equivalences and to mechanisms of interaction in neurosis and anxiety. For in the next generation, with greater prophylaxis and control of sheer physical trauma, it could well happen that the somatic aspects of psychological conflict and stress will occupy the greater part of the practice of general physical medicine.

At the present stage of research, an arrangement of study in terms of areas of experimental data is more reasonable than one in terms of theories, for any attempt at global explanation is premature, and immature theories hide the data and prevent structuring in several alternative hypotheses. Accordingly, we shall examine first the evidence on (a) physiological associations of psychological states (and vice versa), and (b) the associations of relatively fixed traits with relatively fixed somatic characters. In the case of Anxiety, a more advanced knowledge of mechanisms quickly allows these two approaches to be integrated, but elsewhere the growth of the subject is better served by continued organization and consolidation around more local hypotheses. Incidentally, no exhaustive collation of the qualitative literature of pathological psychophysiology is attempted here, and we restrict ourselves to what can be organized around firm concepts of structured and measured psychological data.

With the application of the measures here proposed, enabling the estimates of degree and kind of neurotic disorder to approach the exactness of the physiological measures, a much finer resolution of psychophysiological concepts may be anticipated than is now found in the literature. In present reports the conclusion that "no relation is discoverable between the physiological and personality measures" appears with monotonous regularity and does not surprise any psychometrist who looks at the a priori "personality measures" or the arbitrary evaluations of emotional states that are used. The precision of the physiological measure, though sometimes criticized, has generally been far above that of the measures suggested by psychologists. And in all too many of the studies directed by physiologists, highly competent in the physiological field, the psychological estimates seem to have been thrown in as an afterthought, popularly and vaguely defined, and casually applied. It has been exasperating to be unable to draw firm inferences from good physiological experiments of this kind. Interdisciplinary research, at this rate, risks the charge of having *no* discipline.

A second and major difficulty in proceeding to sure inference from studies now in the literature is that the vast majority of researches use univariate designs, relating the one dependent to one (or more) independent variables. Usually, the main concept, such as, say, anxiety, stress, or neuroticism, is, by some naive fiat of the experimenter, alleged to be properly represented by one test variable. Since only a fraction of the variance of any one variable can be ascribed to anxiety (single, factor-pure measures being at present quite unknown) and vice-versa, any connection found between the first and second variable is open to conceptual explanation in an infinite variety of ways. A succession of univariate researches, each claiming to be on the concept of anxiety, but each using its own peculiar representative variable (tremor, symptom checklist, clinic attendance, corticosteroid secretion, etc.), cannot be brought to coherence but remains an intrinsically non-fitting jigsaw puzzle.

Once the multivariate, factor analytic structuring of these manifestations has been made, however, a retrospective scientific contribution can sometimes be salvaged from these univariate studies in the light of the known functional unities. For example, such studies have sometimes succeeded in discovering and establishing a significant linkage, as a mean difference or a correlation, between the dependent and independent variables, though the interpretation of this correlation has been impossible so long as the two variables stood alone. From the factor analytic theory, an inference can often be drawn as to what the magnitude of such a correlation should be, and the agreement or disagreement of this factor-hypothesized value with the value in the univariate study contributes to the confirmation or the disconfirmation of the factor theory.

In the comparatively new realm of scientific explanation represented by psychophysiology, the existence of complex and multiple connections makes the multivariate experimental design particularly apt, and its systematic application would undoubtedly bring a far greater rate of progress than has so far prevailed. In the physiological field, it has one further advantage that is not to be despised, namely, that it permits the organism to remain intact. One observes the total organism in its natural setting (on a wide range of test responses), extracting response connections by statistical analysis. By contrast, the controlled experiment, commonly requiring interference with function or even, in animals, surgical operation or death, often upsets by the operational by-products the functional relation it sets out to understand.

Recent work on anxiety and stress has been particularly plagued by the fallacy, mentioned above, of assuming that by fiat and a priori reasoning a single variable can be considered identical with a single concept, or that a certain stimulus produces infallibly a pure anxiety response. This assumption thus leads the experimenter to decide that he can set up a stimulus which he calls, on popular belief, an anxiety, or stress, or fatigue stimulus. Thereafter he proceeds confidently to assume that the *response* pattern he is observing is pure anxiety, or pure stress, or whatever the experimenter has ordered it to be. The thesis of the preceding chapters is that there do indeed exist constant, unitary response patterns—a limited set of some ten to twenty dimensions of response built into the repertoire of the organism—but that any subjectively or randomly chosen environmental stimulus is likely to produce a response that is some combination of these (see also Chap. 11). The chance of an experimenter being able to choose a priori a stimulus which happens to be the "pure stimulus"—the provoker of one single, pure, dimensional response, and no other—is as remote as that of landing on the artist's primary colors in a random stab at the spectrum. If stimuli are to be used in repeated experiment, they need first to be assigned their "psychological provocation dimensions." As we have seen earlier, this requires a taxonomy of stimuli, based on pattern analysis of factor-loading patterns, and this can be done only after the response patterns have been factored into unitary dimensions. For those who wish to pursue it further, the theory of dimensionality of stimuli mentioned above has been developed elsewhere (44, p. 286).

Because of this last shortcoming in many anxiety and stress studies, it will frequently happen in our attempts to integrate otherwise excellent data in the literature that we shall be compelled to guess an answer to such questions as: What particular mixture of stress, anxiety, etc., response patterns was Experimenter X's stress stimulus really likely to provoke? Was it a stress stimulus in the specific determinate sense of evoking the Stress pattern (P.U.I. 4) of the previous chapter, or was it an Anxiety (U.I. 24) stimulus, or an Adrenergic response (P.U.I. 5) stimulus? For, one must repeat, if physiological reactions are to be meaningfully attached to psychological states, it is necessary first clearly to distinguish, as an experimentally replicable unitary pattern, the psychological responses we are talking about. This has been the reason for concentrating, in the preceding chapter, on a Taxonomy of psychological states as such, before the present inquiry into their physiological associations.

Special Problems in the Formal Analysis of Psychophysiological Evidence—Improvements in Factor Techniques

In our opinion, at the present stage of exploratory search for gross outline structure and essential concepts, the multivariate method is the most profitable approach and its techniques should be learned and applied by far more researchers than now employ it. Nevertheless, we would be first to insist that it also has its difficulties and needs further refinement. No known mathematico-statistical model is likely to meet at every point the complexities and subtleties of concepts and interactions which a suspicious intelligence probing nature can envisage as possibly necessary. Let us, therefore, in this introductory section, try to anticipate ways in which an alertness to modification in our models and methods of analysis might better elucidate the natural mechanisms and modes of organization.

Preliminary methodological discussion has already mentioned the possibility of non-linear relations in longitudinal P-technique, just as in ordinary R-technique analyses. One reason for suspecting their presence in P-technique lies in the prevalence of homeostatic mechanisms, such that an individual already above his average level on, say, expressions of physiological anxiety, will not increase in level in response to a standard anxiety stimulus, so much as a person at a sub-average level, by reason of the homeostatic pressure to remain at the mean. Lacey (135) has suggested one way of handling this, namely, by partialling out the absolute level, and in general it is possible by rescaling scores to permit the factor analytic model to analyze such data effectively. As mentioned before, some investigators, like Lacey (135) and Lord (140, 141), have proposed statistical devices to eliminate, in greater or lesser degree, correlation of the absolute level with the increment of change. We agree with McNemar's alternative formula (154) for eliminating the correlation of level and increment due to shared experimental error, but we question elimination of anything more. The avoidance of non-linear relations and of attenuation of correlations in P– and incremental R-techniques may need to be caught by a homeostasis-effect-eliminating statistic. If it can be shown that with the same fixed stimulus the outward movement (from the mean) of a variable is greater if the individual is caught near his mean than at a deviant position (and, conversely, with stimuli operating in the opposite direction, that a deviant score shoots more toward the mean than one already near to it), a score transformation system should be used that introduces a constant change for a constant stimulus. It seems more likely that this will have to be experimentally determined than by any a priori statistic. So far we have done tolerably well in locating about thirteen change patterns, consistently across P- and incremental R-technique experiments, without this; but undoubtedly its possibilities in giving more refined consistency should now be investigated.

A second formal problem in using simple models lies in the probable greater prevalence of feedback effects (of which homeostasis itself may be considered a special instance) in physiological rather than in psychological data, for example, in regulation of blood sugar levels and hydrogen-ion concentration (see 160, pp. 100 ff.; and 202, pp. 601 f.). Any stimulation and subsequent rise of a pattern will therefore tend to be followed by a decline, after a period defined by the feedback mechanisms, and the most probable conclusion to be drawn is that this will result in a dampened wave form fluctuation until the equilibrium is reached. Presumably, also, each system would have its own cycle frequency.

A further characteristic of the systems of reaction which we are studying is that the pattern of the response factor in the initially stimulated departure from homeostasis may be different in some degree from that of its return. Some elements may return more slowly than others, as a flock of startled birds fly off together but return one-by-one. Related to this is the possibility that physiological states of long duration, such as anxiety continued over many months, may assume, for many reasons, a different form from the anxiety of a few hours. We have noted this possibility previously (Chap. 9) as one conceivable explanation of the fact that incremental state patterns over a four-week period (R3 study) differ somewhat from incremental state patterns over a nine-month period (CQ2).

Most of these considerations point to the system of multivariate analysis known as P-technique (35) as the most likely candidate for maximum structuring of the relations of physiological and psychological variables when considered over time, in a succession of states. Several proposals have been made, however, by the senior author (44, pp. 674–680) and by fellow contributors in the 1958 and 1959 A.P.A. symposia, notably, Moran *et al.* (see MM, Appendix I) and Damarin (see TD, Appendix I), to make the P-technique factor analytic model more responsive to the complicating realities discussed above. Obviously, there is no need to restrict investigation of this field to a mechanical application of the factor analytic model. What is needed next is its application with all kinds of intelligent, statistically hybrid adaptations, for example, with analysis of variance, multiple discriminant functions, etc. In fact, the following modified models and procedures are suggested at present as most likely to lead to still greater clarification of the psychophysiological relations we are here studying:

1. A change of scaling of raw scores, as discussed above, so that homeostatic distortions are reduced and the relation of variable-to-variable, and variable-to-stimulus are made most universally linear.
2. The use of maximized lead-and-lag correlation (44, pp. 679 f.), in which, by a computer programmed for serial correlation, a lead of each variable on every other is discovered (presumably agreeing with their specific causal lag) which maximizes (by exploration over, say, three time-points in close succession) the correlation. Factors from such a matrix presumably will be clearer.
3. The working out of serial auto-correlations (each variable lagged on itself) to discover the existence of cycles and their periods. Cycles present special problems (see, for example, 44, p. 678), and in some cases need to be removed, though in general both cycling and trend data should be retained in the factoring. Factors highly correlated with time will separate from one another and from time

if simple structure rotation is carefully pursued. Moran and Mefferd's plan of building into the matrix artificial series representing a wide array of possible periodicities to identify factors emerging with such periodicities (see citations under MM, Appendix I), is a good rough short-cut to this end, relative to exhaustive auto-correlations.

4. Once a response pattern has been roughly identified as the mean of variations presumably both up and down, the rough estimates for the corresponding factor can be plotted over time. The sections of the P-technique data on up curves can then be excised from those on down curves; and separate factorings on accumulated up stretches (and similarly for total down experiences) will lead to definition of possible pattern differences in upward and downward departure from, and return to, the base level.
5. Data from long and short response (i.e., departure from the mean) periods should similarly be separately factored. Thus one might, for instance, check the hypothesis that hypertension, stomach ulcer, and protein metabolism disorders appear secondarily with prolonged anxiety, though are not manifested in the same form, even in lesser degree, with temporary high anxiety scores; or that *prolonged* low U.I. 23 (Ergic Inability to Mobilize) produces real intelligence test impairment while momentary drops in U.I. 23 do not; or that habit sublimations appear with prolonged U.I. 20 action but are not part of its temporary pattern.
6. Much light could be thrown on peculiarities of patterns by planned inclusion of common variables in parallel studies by (a) P-technique, (b) Group mean P-technique, (c) Incremental R-technique, (d) Ordinary R-technique. In ways which will be obvious upon consideration, these would permit distinguishing phenomena tied up with homeostatic return from those physiological associations which persist or accrue.
7. It is desirable to plan P-technique studies to permit accurate simple structure rotation, so that analyses may proceed confidently to second-order structuration. Second-order findings are important because, first, it is possible that certain psychological factors may be second-order to a set of physiological response patterns, for example, as one suspects the sex erg to be an organizing influence among endocrine effects. Or, conversely, the physiological influence could be second-order, as one suspects ACTH secretion is to a variety of emotional responses. Second, a certain rapid, pre-set sequence of distinct response patterns (primary factors) could be picked out, for, with the right conditions, an organization in sequence could appear as a second-order factor.

The idea of factoring physiological and psychological variables together, which we have advocated and pursued in several P-technique and R-technique studies, has usually uncovered primary factors containing, simultaneously, physiological and psychological variables, as if both are triggered by a single stimulus, for example, the P.U.I. 1 state of Excitation versus Torpor definitely affects both. However, the model of a single psychological response factor with several separate *physiological* primaries within it, triggered in brief sequence at different times, is also a possibility. An instance of primaries linked in a rapid sequence is seen later in this chapter in that the factors for the initial Adrenergic Response and the ensuing (corticoid) Effort Stress response seem linked in a single second-order factor. Doubtless, with staggered, lead-lag correlation among the primaries, several other such master pattern second-orders would be discovered. Thus, certain diverse exhaustion factors in neurosis, such as, U.I. 21—, 23—, and 29—, might rise together in a second-order factor caused by prolonged conflict.

Finally, the methodology and our consideration of its adaptation to possible models must not overlook the standard requirements of general scientific factor analytic work in this field, notably, good sampling of variables and classes of variables, covering classes of sociological, dietary, and general environmental variables which, though not of primary importance in the experimenter's thinking, might account for substantial parts of the unknown or error variance sources for the psychological and physiological variables concerned. Some of these could be manipulated and used in the condition response design (35, pp. 375 ff.; 65; 70). Other standards are scaling of variables to approximately normal distribution; obtaining reliabilities, in order to correct loadings for attenuation; and inserting adequate markers for factors already known.

Some of the above methodological possibilities suggested by our initial work, notably, staggered factor analysis, have not yet been applied so far as research results now available for discussion are concerned. However, all but the more complex improvements have been considered, and, in particular, attention has been given to good sampling of variables and to proper marker representation of earlier P-technique factors in later work. The sampling of ratings and questionnaire responses for work on states was initially guided by the factors emerging from the personality sphere factorings (29), while the objective tests have been sampled from those occurring in the eighteen dimensional O-A battery. However, the existence of certain restrictions in P-technique on normal sampling practices should be stressed. From *L* and *Q* data it has not been possible, because of the great demands in P-technique on the subject's time, to include more than a couple dozen variables, and from *T* data there has been restriction to tests that could be repeatedly administered. Consequently, it is likely that a few additional state factor-patterns could yet turn up as factors in the interstices between these variables, though the good alignment of our state patterns with those in the more exhaustive rating studies of moods by Nowlis and Green (168) suggests that the most important dimensions are already caught.

As to the presently known state factors, set out in psychological content in the previous chapter, our conclusion has been that good parallelism exists between the form of state factors and of trait factors. Almost all state factors are found to have apparent equivalents in trait factors, but not conversely. Our purpose in the present chapter, after the above closer concentration on method, is to ask: (i) what physiological associations are found with these states, (ii) are any physiological state dimensions recognizable without any psychological, behavioral associations, and (iii) what is the general, second-order interaction of these psychophysiological state dimensions. It will be remembered from Chapter 9 that Anxiety appears as a single state factor, but that neuroticism must be considered as a set of states operating to produce a neurotic phase, which is still not identical with total neuroticism in so far as it lacks the contributory fixed traits. Thus, for clarity, we shall speak of a person low on P.U.I. 2, 8, 9, 11, etc. (the neurotic factors which fluctuate) as in a neurotic phase, but unless he is also chronically low on U.I. 16, 21, etc., his condition still does not correspond to the clinical definition of neuroticism as a trait and he cannot be said to be in a neurotic state in the sense that a person scoring high on U.I. 24 is simply a case of high anxiety, considered as state or trait.

With this preamble on methods and concepts, we can now turn to the evidence on the physiology of the already recognized and defined state patterns. In so doing we shall not reproduce (from Chap. 9) the psychological elements of each pattern, but regard them as read. Also, because the study of Anxiety is more advanced and nearer to closure than that of the other factors in the neurotic phase, it is proposed to depart from the order of presentation in most chapters and start with the definitive evidence on the Anxiety state.

Review of Experiments Contributing to Defining Physiological Associations of the Anxiety State

The essential findings concerning the anxiety state are best presented in terms of the loadings of purely physiological measures found on the state factor in the five experiments now available: an ordinary P-technique study on one normal subject (the W study in Appendix I), an R-incremental study on eighty-six young male adults (R3), a serial, stimulus-controlled P-technique on eight depressive neurotic patients (MR), a P-technique study on a female schizophrenic under-

TABLE 10–1

Physiological Variables Loading U.I. 24 Anxiety as a State

Variable Title (in High Anxiety Direction)	Studies (Described in Appendix I)				
	R3	MR	W(221, 222)	MM**	TD**
High systolic pulse pressure	+30*	+08	+71	+08	
Lower absolute level of galvanic skin response	−26		−25		
More plasma 17-OH (keto-steroids)		+43	+10	+22	+23
Lower pH saliva (acid)	+04		+42		
Lower cholinesterase in serum			−78		
Higher basal metabolic rate			+59		
Faster respiration rate		+45			+21
Lower pH urine (acid)			−32		
Fewer staff Neutrophils			−30		
More red blood cells			+22		
Faster reversible perspective			+19		
Faster heart rate		+30	(−04)	+20	+15
Greater volume of saliva secreted	+27		(−01)		
Higher hippuric acid (in urine)				+74	
Lower urea concentration		−06		−32	
Higher histidine (in urine)				+52	

*It will be noted that the usual practice has been followed in this table of inserting loadings for inspection, no matter whether they agree in sign or are significant in magnitude, if the variable has already come out high on one study. However, attention is called to sign inconsistencies by putting such in parentheses.

**The primarily physiological MM and TD studies are discussed in the text p. 196f. and Appendix I. Their loadings are given more fully in Table 10-2.

going therapy (MM), and a P-technique study on a cancer patient (TD). (The latter study throws some light despite most variables necessarily being chosen in connection with theories of this disease.) With this diversity of subject and method, whatever common core is found should have a convincing quality. On the other hand, no safe conclusions can be drawn about any differences in the Anxiety pattern in the five experiments as definitely being due either to subject differences or differences of method or setting, since they are confounded. For economy and to concentrate physiological issues, purely psychological variables have been completely excluded from Table 10–1; but they may be seen, for the corresponding researches, in Tables 9–2, 9–3, 9–4, and elsewhere (65, 66), and, of course, they have been used to help establish the identity of the factors. Table 10–1 deals with all physiological variables that were repeated in two or more of the five studies and, also, one or two others that are special to a single study but are very highly loaded. The fourth and fifth studies had many more physiological variables, around which we shall discuss later other variables not cross-validated, giving loadings only at the level of indications.

The matches of pattern are not as good as in some other response factors, but they are indirectly supported also by the fact that no alternatives in the various series are clearly possible. And one must remember that the conditions were very diverse in the five studies and such as to produce changes in the lower loadings of the kind indicated. However, it is possible to see agreement in three major areas: (a) an amino acid excretion—hippuric and acrylic, especially—in the MM study (see also Table 10–2) and, across this and three others, a raised 17-OH corticosteroid secretion; (b) an autonomic pattern of higher systolic blood pressure, higher heart rate, more rapid respiration, and other accompaniments of higher basal metabolic rate, along with reduced electrical skin resistance; (c) in one study only here, but with supportive evidence elsewhere, a drop in serum cholinesterase. There are also indicated changes toward acidity of saliva and some changes in blood cell count (falling neutrophils, and, less definitely, eosinophils).

This pattern, in fragmentary confirmations, is perceptible in the previous work of Herrington (114) and Wenger (220), who confirm pulse rate, and add raised body temperature and larger P.G.R. deflection, though our work suggests only a small loading in the last. Search for the nature of the consensus in these earlier researches must try to perceive that consensus in spite of differences of labeling conventions. What we are calling anxiety is in one major study called "autonomic response pattern," though we can find in that very same study patterns already accounting for what we have indexed as P.U.I. 1 (Torpor *vs.* Excitation) there labelled Vagotonia, and for the Adrenergic response (P.U.I. 5 here). Herrington (114) notes an association of his bunch of measures, which correspond most closely to our Anxiety factor, with high behavioral activity level, social vigor, and desire to excel, while Darrow and Heath (78) noted an association with paranoid trend. These relations we add as probables, suitable for further factorial study. Their rating methods were such that they need not be taken too seriously, but they are at least compatible with our picture. Psychologically, they are consonant with our findings of substantial loadings of L, Paranoid tendency, and Q_4, Ergic Tension, in the second-order Anxiety factor (pp.55 f.), for these would be called "paranoid" and "overactive" associations.

In all discussions attempting to align conclusions from pre-factor analytic, single-variable studies with our own, one must keep in mind two problems. First, these studies commonly have talked of "anxiety" when almost certainly they were measuring the combined effect of anxiety, stress, excitement, and several other factors which we would now separate. This applies to much of the work of Spence's students on anxiety and learning and even to certain factor analytic studies, which have merely taken the first factor appearing (often unrotated) in this area of variables as the anxiety factor. Good factor matching procedure requires that one add to the direct evidence of identity, in the form of a good matching index, sufficient indirect evidence, by exclusion. That is, there should also be proof that the other factors emerging are simultaneously taken care of in terms of matching other major factor concepts already known in that field. This is especially desirable where the factors under inspection have high "cooperativeness" in their loadings, so that they could easily be confused when out of each other's company—and the Anxiety, Stress, Adrenergic, and Vagotonic factors are certainly markedly cooperative. Second, one must keep in mind that the methods previously used for distinguishing patterns are statistically impotent and confused in their implications (such as Darrow's "four-fold table" method, e.g., that anxiety is high on cardiovascular variables and low on skin resistance, and so on).

Consequently, the best that can be done in salvaging such experimental effort for present discussion is to forget the theories and to consider the established significant correlations of a variable with the alleged anxiety reaction as a strong suggestion that the variable be incorporated in the next factor-analytic study of anxiety, stress, etc. For example, palmar sweat (the ferric chloride method) has been found to be greater during application of stress (163, 164), but it does not correlate with the Taylor Scale (12). Our hunch is that palmar sweat will correlate most with the Stress pattern (P.U.I. 4) and with Excitement (P.U.I. 1), but still slightly with Anxiety (P.U.I. 9)—for it correlates about 0.6 with electrical skin resistance, which is loaded in Anxiety.

Certainly, the most systematic studies of fall of skin resistance show it to be related to nocive stimuli and to a whole gamut of fear, anger, alarm, etc., emotions (44). In other words, palmar sweat correlations with a performance do not permit a conclusion to be drawn that that performance is due to high Anxiety rather than high Stress or high Excitement factor. However, further researches should comb new univariate researches appearing after these considered here, in case some single correlation should have been established suggesting inclusion of a further variable in the list in Table 10–4, on which a definitive checking by factorization should be done with the most exact physiological measurements.

At the present juncture, with so conspicuous a dearth of adequately planned P-technique studies, no apology is perhaps necessary for our pressing into service the studies represented in the last columns of Table 10–1 (MM and TD), which primarily were aimed at other goals (the nature of schizophrenia and of the cancer process). Let us, however, in Table 10–2, explore what else they have to offer, and, at the same time, give the substantiating detail for their inclusion in Table 10–1.

The first of these, MM, by the psychologist Moran and the physiologist Mefferd (see MM, Appendix I), would have psychological markers were it not that Moran's excellently standardized psychological tests were put together without awareness of our previous P-technique variables. The stability of their factors, derived from two separate periods of seventy-eight and seventy-five days with a schizophrenic, is attested by three independent factorings (each alone and both together) each giving a good oblique simple structure. The second study, TD, by the endocrinologist Trunnell and the psychologist Damarin (see TD, Appendix I), also had time periods, in this case on a cancer patient, but we have not included the third period since it could be argued that it is rendered atypical by the terminal stage of cancer, and we suspect that a discrepancy between 17-OH and the total steroids in the stress pattern may already indicate an atypicality in an earlier stage.

The interesting discovery was made in both studies and all matrices, as search was made for the anxiety and stress pattern, marked by corticosteroid output, that a third factor always exists which is associated at least as much as these two with high corticoid excretion. This is a very clear and stable factor which we have called "urinary electrolytes with corticosteroids" marked by high sodium, potassium, and other metallic ion excretion; high creatinine and urea; high urinary volume; higher respiration rate, and, of course, higher corticoids. We leave this for the physiologists to interpret,[1] merely noting here that the combination of high steroids and sodium excretion (too low here for record, but noted by others) in the stress pattern requires that the distinction of stress and this new pattern be made by careful attention to other variables. In short, the factor method reminds us, as usual, that we do not really know a pattern until we know other existing patterns with which it might be confused.

Even so, it must be pointed out that the distinction between the Anxiety and Stress patterns, without psychological variables to help us, has not been made with high confidence. Principally, we have been guided in the MM study by the higher steroid and electrolyte loadings of F2, and higher pulse, favoring the stress interpretation and by the hippuric acid association in F1, favoring Anxiety. Also, the higher association of F2 with chlorpromazine (see below) and other stress-provoking treatments favors its interpretation as stress. In the TD study, the stress factor again has higher corticoids. At the same time, the TD Anxiety factor is associated with lateness of day in week (time since seeing visitors) and higher resort to analgesic drugs, suggesting the well-known association of pain sensitivity and Anxiety. It is noteworthy that both Anxiety and Stress are associated (as other factors are not) with accord of greater attention by the nurse. Parenthetically, the lower loadings in Table 10–2 are attenuated relative to what are probably the true values, through averaging two or three separate studies, all of which are bound to be imperfect in rotation. Consequently, we have recorded these mean loadings right down to the ±.10 hyperplane.

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[1] It might simply be large fluid intake, though this is probably too simple. However, Mefferd has noted the same in stress studies in rats and guinea pigs. It even could be our P.U.I. 5 Adrenergic Response pattern, for Addison's disease brings low corticoids and low plasma sodium, with loss of water.

Two variables not included in Table 10–2, because they are not of general applicability, are chlorpromazine dosage (part of the treatment, which strongly loads the Stress factor) and body weight, both in MM. Since chlorpromazine has been used as a reducer of anxiety, the reaction of psychologists on first seeing this loading of chlorpromazine in what we have interpreted as a factor of increasing stress was seriously to doubt the consistency of our interpretation. However, recent studies by Porteus (177), conclude from an independent, methodological approach that chlorpromazine treatment does produce some reactions comparable to stress effects. Similarly the stress factor-loading of putting on weight can also be seen as part of the correlation of the stress factor with amount of treatment, for weight increase is commonly an effect of insulin on sugar metabolism. Incidentally, this weight correlation (if not artifactual, as here considered possible), would distinguish the factor from Anxiety, since, in Grinker's observations (105)—not yet on a statistical basis—prolonged anxiety should mean loss of weight. Certainly we find no weight *increase* with Anxiety, but only with Stress. It is also noteworthy, apropos of previous confusions of anxiety and stress, that two psychological tests sometimes considered tests of anxiety—low digit span and poor perception in the four-letter-word test—and which are not so found in our systematic study of psychological performances in the Anxiety state factor P.U.I. 9, appear in MM on the stress factor. That is to say, these performances decline more in immediate stress than in anxiety, though number facility here as in our major factorizations (Table 5–4) does have some appreciable influence from Anxiety. A purely psychological distinction of Anxiety from Effort Stress is thus becoming possible from our analysis both on performance tests and on questionnaire responses, and on physiology.

TABLE 10–2

SUSPECTED ANXIETY AND STRESS RESPONSE PATTERNS IN PURELY PHYSIOLOGICAL P-TECHNIQUE STUDIES *

(Courtesy of Moran, Mefferd, Trunnell, and Damarin)**

Putative Anxiety Factors

Moran-Mefferd Study (MM) *Factor 1*	*Mean*	*Trunnell-Damarin Study (TD)* *Factors 3 and 3 in original TD matrix*	*Mean*
High m-OH-phenyl hydracrylic	74	Later day in week	40
High m-OH-hippuric	74	Higher Resort to analgesic drugs	32
High p-OH-hippuric	57	Lower Glucuronidase in urine	−32
High Histidine	52	Record of more concern and attention by nurse (many lines written to describe patient)	24
Low Urea	−32	Higher 17-OH Ketosteroid in urine	23
High ϕ alanine and leucines	24	Higher Respiration rate, p.m.***	21
Low Number facility	−23	Lower Phosphorus in serum	−16
High Glycine-serine	22	Lower Glucuronidase in serum	−16
High Steroids	22	Higher Sodium in serum	16
High Pulse rate	20	Higher Pulse rate, p.m.	15
Low Aspartic acid	−13	Lower Potassium in serum	−10
High Glutamic acid	12	Higher Body temperature	05
High Blood pressure-diastolic	09		
High Blood pressure-systolic	08		

Putative Stress Factors

Factor 2	*Mean*	*Factors 5 and 9*	*Mean*
Low Digit span	−86	Higher Corticosteroids in urine (one study only)	43
High Treatment (code)	80	Lower Glucuronic acid in serum (one study only)	−40
Low 4-letter-work (test)	−48	Higher Respiration rate, p.m.	34
High Pulse rate	47	Higher Pulse rate, p.m.	33
High Steroids	39	Higher Sodium excretion in urine	28
High Arginine	38	Lower 17-OH Ketosteroids	−22
Low Glutamic acid	−31	Lower Alkaline Phosphatase	−20
High Glycine-serine	31	Higher Body temperature, p.m.	15
High Calcium	28	Higher Atmospheric temperature	15

High Creatinine	27	Low Humidity (at nearby airport)	−12
High Magnesium	16	Higher Total protein measurement	12
High p-OH-mandelic	12	Record of more concern and attention by nurse	09
High Respiration rate	07		
High Blood pressure-systolic	04		

"Urinary Electrolytes With Corticosteroids"

Factor 4	*Mean*	*Factors 2− and 8−*	*Mean*
High Sodium	65	Lower Sodium balance (one study only)	−82
High p-OH-mandelic	58	Higher Rate excretion Sodium in urine	76
High Potassium	55	Higher Rate excretion Nitrogen in urine	75
High Magnesium	44	Higher Rate excretion Potassium in urine	75
High Unknown 4 yellow	42	Large Total urine volume	67
High Histidine 2	40	Low Potassium balance (one study only)	−59
High Calcium	37	High Rate excretion uric acid in urine	57
High p-OH-phenyl acetic	31	High Rate excretion Creatinine in urine	48
High Histidine 1	31	Low Nitrogen balance	−45
High Urine volume	30	Higher Rate Corticosteroid excretion in urine (one study only)	37
Low Tyrosine	−23	Higher Rate 17-OH Ketosteroid excretion in urine	16
High Steroids	18	Higher Respiration rate	12
High Urea	18		
High Respiration rate	13		

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*Quite low loadings are included here because these are the mean of two factor experiments, and there would, of course, be much regression from one to another. Also, markers from previous research, for example, systolic blood pressure, are included as a check on their consistency of loading direction, even though their loadings are lower than .10.

**The above contributors will soon publish their own analyses of the Table 10-2 data, in more detail than is possible here, and probably in terms of other orientations and viewpoints. Some further detail on these studies, however, is provided in Appendix I (see MM and TD).

***p.m. = in the afternoon.

Our main contention in this section—that the stress reaction is as distinct from anxiety physiologically as it is psychologically—does not conflict with the view of Mefferd and others that the stress reaction differs somewhat according to the character of the stress stimuli, which bring out specificities peculiar to heat, high altitude, and other traumata. Various physiologists have also given evidence of associations with high urinary sodium, potassium, uric acid, raised uric acid/creatinine ratio, and raised serum cholesterol and sodium. However, we would contend that these variations are partly explicable by co-action of other factors. For example, the variables just mentioned belong partly to the Effort Stress factor (P.U.I. 4), but also to the urinary electrolyte factor (possibly related to the P.U.I. 5, Adrenergic pattern). Conceptually, if one wishes, and if the facts support a second-order stress factor, one can label the General Adaptation Syndrome as a combination of these factors. As such, it will alter its proportions of primaries from situation to situation, since they do not correlate unity. However, such variations about the central pattern will also exist for the primary Effort Stress factor, and we have ourselves marshalled evidence that it is sometimes produced by external, ineluctable demands and sometimes by high internal standards. Thus, both superior and inferior adding performance has been shown associated with stress, the former when it is the cause of the Effort Stress, the latter when it is a consequence.

Glancing finally over presently available physiological evidence specifically on the Anxiety factor, we should note that the first P-technique studies above (carried out in our laboratory and related directly and explicitly to a measured anxiety state factor) tended to concentrate their physiological search upon corticosteroids (used partly as an indicator of ACTH, though the latter has more recently become susceptible to direct measurement), blood corpuscle counts, cardiovascular measures, and such serum constituents as glucose and cholinesterase. This left one important region of metabolism, namely, that of protein and carbohydrate anabolism and catabolism, largely untouched. The work of Mefferd and Moran, and Trunnel and Damarin, contributes especially by supplementation in this field, but further evidence, by Grinker and his co-workers, Korchin, Persky, Basowitz, Schwartz, and others (10) though not factored, contributes extensively regarding the amino acid effects of anxiety. Unfortunately, until recently, it has not been possible positively to link their conclusions with defined factor scores.[2]

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[2] The data from Grinker and his co-workers in column 2 of Table 10–1 is from a later experiment and represents an actual factor analysis. Their earlier amino acid data can, furthermore, now be fairly reliably related to factor structure through the Moran and Mefferd data in Table 10–2, as stated above. Parenthetically, it should be noted that since the time when both their and our earlier studies began, it has become realized that the 17-OH steroids, rather than the whole corticosteroid estimate, may

However, the realistic character of their anxiety or stress stimuli (parachute-jump training situations (10)) and their use of correlational, serial repetitive, and comparative designs, make it possible, with the help of the Mefferd-Moran patterns, to draw reasonably reliable cross inferences from their data to factor concepts. Grinker's attention was called to the promise of this field by the finding of a significantly higher hippuric acid secretion among high free anxiety cases and anxiety neurotics than among normals and catatonic schizophrenics (171; 172; 178; 10, p. 118 ff.), following Quick's test (179), using sodium benzoate to test the efficiency of the liver in converting benzoate to hippuric acid. It might be noted that others have shown that schizophrenics are sub-normal in this respect, as if devoid of anxiety (or of general autonomic reactivity, to recall our first title for the anxiety state factor) which fits the concept of schizophrenia as a state of absence of drive. The subsequent studies by Grinker's group have shown that a state of anxiety or stress causes, most quickly and sensitively, an eosinopenia, followed by a fall in glutathione (greatest fall at about ten hours after the situation), but not of glycine and a prolonged steady rise in hippuric acid excretion. Since glycine is involved in the hippuric synthesis, one would expect its level to fall with rising hippuric acid (especially if its amount is made critical by feeding benzoate to the subject). The evidence on glycine level (see below) is uncertain, however. Possibly it does fall momentarily, but the above anxiety factor from Mefferd suggests over sufficient time a *rise,* as if glycine is being produced in greater amounts to meet the raised demand for it, or as if anxiety stimulates amino acid production generally.

Integration of Conclusions on the Physiology of Anxiety as a State

In attempting to integrate such unfactored findings with our own in a final synthesis, we have to surmount difficulties mentioned earlier in such bridging to the past literature, two of which are outstanding. First, how can we infer, from the real life situations described in these studies, which one might represent the Anxiety factor stimulus and which the Stress stimulus? Second, how can we separate the conclusions regarding Anxiety as a state from those concerning Anxiety as a trait? The parachute-jumping, etc., seems to us to have presented for these men more Stress than Anxiety, and their anxiety was connected

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be more important as an ACTH manifestation and as the stimulator of amino acid changes. Consequently, in moving across these studies in Tables 10–1 and 10–2 and elsewhere, some with total corticoids, some with 17-OH only recorded, this degree of uncertainty in matching and inference must be kept in mind. The later Grinker data in Table 10–3, as well as the Mefferd and Moran data, are in terms of measured 17-OH corticoids.

rather with the social situations generated with passing and failing the course and with the disbanding of the group at the end of the course (10).

As to the eosinopenia, factor analytic evidence (Tables 10–1, 10–2, and 10–3) suggests that white corpuscle count behaves differentially, the total count being particularly high in depression, the lymphocytes being particularly low in both stress and fatigue,[3] the per cent neutrophils low in Adrenergic response and in Anxiety, the eosinophils in the Diurnal Fatigue factor, and also in a further factor which contrasts higher eosins and basophils [4] with low neutrophils. This last pattern is P.U.I. 7, not set out here (but see (44), p. 662). It had, in our original P-technique studies, a fair claim to being some kind of anxiety factor and is worthy of further special study. It is possible that the low stem neutrophil score in our main anxiety measure connotes also some tendency to low eosins and basophils. The most likely interpretation, in our opinion, is that eosinopenia in the training situations represented fatigue and Adrenergic response factors, not Anxiety. However, eosinopenia is a very rapid reaction, appearing in mice even to the stimulus of switching on a light (207), and may be a response to becoming alert rather than to full stress (or, if we admit anxiety, to true anxiety). This is consistent with its becoming a cumulative state of marked eosinopenia in prolonged alertness (fatigue) and its hypothesized association here with the more momentary Adrenergic, fear-anger response.

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[3] Fuller *et al.* (101), referring to a general stress syndrome from emotional states, conclude that marked eosinopenia is seen more frequently than a change in 17-OH in the blood. Unfortunately, no physiologist has yet tried a factor analytic approach to see how the various major endocrines share among themselves responsibility for the numerous physiological variable changes commonly studied, and we believe that eosinopenia is more an expression of fatigue or stress than of anxiety.

[4] Grinker *et al.* found that ordinary physical work did not drop the eosinophils, whereas anticipation of a parachute jump, and actual jumping produced marked reduction (10). While, as Grinker *et al.* point out, quite a range of physical and physiological influences will cause eosinopenia (e.g., examinations, shock therapy, ACTH, fear of surgery), they believe that anxiety is one of the more powerful. Our results would suggest, however, that the stress reaction (as defined here) more powerfully involves both ACTH and eosinopenia than Anxiety (U.I. 24) does. This stress reaction is primarily associated with effort at control. Hoagland's studies (117, 174), showing marked increase of 17-OH excretion in pilots engaged in activities requiring close and constant concentration of attention, support this finding of the primacy of effort and fatigue rather than anxiety in 17-OH and, by inference, in ACTH and eosinopenia, too. However, an earlier rather widespread conclusion to the effect that anxiety must be the primary cause arose from the accident that in the complex life-situations observed by the above medical researchers, as well as in our stimulus-controlled, P-technique study (Table 10–3), anxiety or fear happened to be the chief thing to be controlled. On the other hand, expressed Anxiety (U.I. 24, P.U.I. 9) should produce little eosinopenia, and control of crude emotions, even though quite different from anxiety, e.g., anger, should produce strong eosinopenia.

The connection between the amino acid changes (in glutathione, hippuric acid, etc.) and the ACTH response is considered to lie in the effects of the corticoids, released by ACTH, upon the liver. Serum glutathione and glycine then tend to be broken down into urea and carbohydrate instead of being built up into proteins in the ordinary cell anabolism. However, it has been noted that the fall of glutathione in stressful situations is more rapid (a matter of hours) than occurs through direct injection of ACTH or 17-OH corticoids without stress (a matter of days). A special mechanism remains to be investigated.

If we may bring to bear in the conclusion on Anxiety as a state some conclusions on Anxiety as a *trait* (below), there seems evidence to us that hippuric acid excretion is higher from the beginning in individuals whose anxiety partakes particularly of the Threctia (or H—) personality component, which magnifies real as well as neurotic anxiety reactions (see p. 56). If we are correct in separating free, total Anxiety, (U.I. 24, P.U.I. 9) from sudden situational fear (in virtue of the stimulus-controlled, P-technique result discussed below) and in making the latter virtually identical with the Adrenergic reaction, P.U.I. 5, then we can come to the conclusion that hippuric acid excretion is a highly specific physiological indicator of true anxiety. Indeed, if we are correct in matching the Moran-Mefferd first factor with Anxiety rather than Stress, raised hippuric excretion [5] is almost wholly tied up with Anxiety, just as arginine is more specific to Stress. Similarly in Grinker's data, the lateness of appearance of hippuric excretion in a continued onslaught of trauma and its association most consistently with anxiety neurotics, suggests hippuric acid excretion to be among the best anxiety indicators, he concludes. In any case, as we eventually conclude, the physiological Anxiety pattern is not to be recognized or measured by dependence on a single indicator, but by a whole physiological pattern, chiefly of hippuric acid excretion, cholinesterase level, autonomic changes, etc., as set out in Table 10–4.

An area of anxiety expression, concerning which there have been many unjustified assumptions and contradictory findings, is that of muscle tension. Countless psychologists have based various experimental conclusions about the relation of anxiety to this-or-that on the assumption that the anxious person will be muscularly more tense. Moreover, contrary to the available evidence of Duffy (83) indicating at least five distinct factors in the muscle tension area, the added assumption has been made of a single tension factor! Parenthetically, in regard to tremor, the evidence is reasonably clear, namely, that both high Anxiety (U.I. 24) and high Exuberance (U.I. 21, which also produces *larger* bodily fidgetings) are associated with greater tremor, as also are certain other factors to a lesser degree (44).

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[5] It should be noted that in Grinker's work (44, p. 33) sodium benzoate is fed to the subject to maximize the pressure for hippuric excretion, but the Moran-Mefferd data show that normal hippuric excretion, without assistance from the mass action law effect arising from an indefinitely large excess of benzoate, still loads this same factor of corticoid stimulation, higher blood pressure, etc.

Hammock and Prince's findings (111) of significantly poorer rifle marksmanship on distant targets under stress may perhaps be interpreted as increased tremor in anxiety or in both Anxiety and Stress. Similarly, it is reasonably clear that the tension in fidgeting, as measured by the fidgetometer (frequency of body weight shifts while sitting in a chair designed to record these) is something distinct and largely in U.I. 22+, Corticalertia. But in the researches on physical tension per se, the lack of agreement is marked, the confusion being extended by yet a third source of error, namely, the application of quite distinct measuring instruments. Tonus, in the resting state, as measured by an arm-snatching apparatus,[6] has zero relation to Anxiety, either as state or trait, though related to other factors. As measured by writing point pressure, in a purposeful writing task, muscle tension tends to be significantly *inversely* related to Anxiety.

To these findings we can now add, through the kindness of Grinker, Korchin, Schwartz, and their associates, data carefully gathered by polygraphic, myograph records on subjects in what we have called the MR (for Michael Reese Hospital, the source) experiment (p. 475), as presented in Table 10–3 and discussed as to general design in Chapter 9 and Appendix I. For the moment, we are interested in the muscle tension findings, which are represented by variables twenty-five through thirty-two. The first four show median levels, and the last four magnitude of oscillation of levels, in each of four areas. (The values are correlations with factor estimates for the eight state factors, defined from the first twenty-three rotated variables, while the first twenty-three variables are given as direct loadings.)

The median and oscillation (deviation) magnitudes of myographic tension tend to agree, as might be expected. In so far as any general tendency exists common to all body areas, it shows itself (a) in F7, in the presumed "artificial" general muscle tension change associated with curare injections; and (b) in F8, in the combined affect as seen by observers in emotionality of test expression, tendency to disagree, high heart rate variability, high ceruloplasm, and the high muscle tension just discussed. The factor with curare is beyond our present scope and the whole technique, theory, and results connected with curare are to be discussed fully elsewhere by Dr. Grinker and his co-workers in articles now in preparation. However, F8 seems familiar and could be matched without affronting any known facts about loadings with U.I. 23+, though with appreciable uncertainty, mainly on low-anxiety self-ratings, low tendency to agree, but high observer rating of sthenic emotions and high emotionality of comment. Tentatively we have called this "Pique," implying that it is a positive response to a challenge as the data in Chapter 11 show U.I. 23 Mobilization to be.

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[6] In this, the subject's arm, while he is reading, is suddenly snatched by a powerful spring. The time taken for the arm to move a standard distance is measured. It is assumed that conscious reflex resistance can barely come into play in the very short time involved and hence that the time taken will relate positively to existing muscle tonus.

In Table 10–3 Factor 2 is a fair match for Stress, F3 for Pathemia and F4, less reliably and mainly by inference from blood pressure variables, for Adrenergic Response. F5 is a pattern hitherto unknown but very definite, combining high pulse rate and high serum cholesterol. More from recent research on blood cholesterol, that of Wolf (231), for example, than from further detail in the factor pattern, we would hypothesize that this is an Undischarged Drive Response representing a physiological reaction not to true frustration, as in Pathemia response, but to continued inhibition of stimulated drive level (see second-order relation to Stress and Pathemia, p. 235 f.). The F6 pattern has high tendency to agree, very low confidence in untried performance, and low susceptibility to embarrassment, with high nitrogen and urea excretion. The latter would tie it with the electrolyte factor in Table 10–2, but psychologically it could match state forms of U.I. 17, 27—, or, more likely, 34—. The possibility that the high physiological involvement pattern located as electrolyte and corticosteroid (Table 10–2) is the same as U.I. 27—, Eagerness or Absence of Apathy, or U.I. 34—, Absence of Autia or Conformity, is a likely hypothesis which needs to be followed up.

However, with the aims of our present treatise, our main concern in Table 10–3 is with Anxiety, Stress, and Pathemia, and particularly in clarifying the anxiety-stress distinction. As far as muscle tension is concerned, which is better measured here than in any other known study, it is clear that massive tension belongs in the Pique factor (possibly U.I. 23) and, also, some in the Adrenergic Response and a little, principally tension oscillation, in Pathemia (apart from the artificial, curare factor). The only clear loading in Anxiety is specifically for tension of the trapezius muscle. It is noteworthy that muscle tension and its consequences in the spinal region and particularly the muscles along the back of the neck and head have long been clinically associated with anxiety and with the vague syndrome of neurasthenia. Knowing how tension in general is distributed, it would now be timely to investigate more closely this particular tension pattern in relation to exact anxiety measures.

TABLE 10–3

Factors in the Stimulus-Controlled (Stress Interview) P-Technique Study (MR):

(In Collaboration with Grinker, Korchin, Schwartz, Heath, Engel et al.)*

Variables** (Stimuli and Responses)	Response Pattern Factors							
	F 1 Anxiety P.U.I. 9	F 2 Stress P.U.I. 4	F 3 Pathemia P.U.I. 2	F 4 Adrenergic (?) P.U.I. 5	F 5 Cholesterol-Pulse Rate	F 6 (Possibly U.I. 27– or 34–)	F 7 Curare Reaction	F8, Pique (Possibly U.I. 23+)
Interview Stress, Presence of	–00	45	43	16	03	–24	04	08
Total U.I. 24 Anxiety, from all markers	72	26	–03	–07	–06	–03	01	21
U.I. 24 Anxiety, from questionnaire	37	47	44	–03	01	19	–21	–09
Annoyance, Susceptibility to	46	–08	–39	06	06	26	24	13
Modesty about untried skills	22	–06	–09	–02	–04	83	–05	–01
Frailties, Willingness to admit	58	–04	13	–02	–01	01	45	–06
Emotionality of comment	–08	–17	–01	–07	–08	–26	–28	38
Symptom Checklist (anxiety-tension)	06	64	–05	–01	03	24	–07	–07
Embarrassment, Susceptibility to	11	–25	–06	–00	09	–69	–07	10
Tendency to agree	11	37	02	–10	00	47	31	–37
Affect Rating—Anxiety	20	03	19	–11	–04	06	09	58
Affect Rating—Anger	–07	23	55	07	05	06	02	17
Affect Rating—Depression	19	–12	67	–04	–06	07	19	–06
Affect Rating—Total	04	02	69	–13	–06	–12	–08	41
Cholesterol free, in serum	–05	–00	–18	–00	84	03	–02	02
Cholesterol total, in serum	–02	07	–05	–06	72	–20	54	02
Cholesterol ratio	–13	–11	12	–07	51	–01	–41	–03

Systolic Pulse Pressure	08	02	12	72	07	03	−10	−05
Diastolic Pulse Pressure	−10	−03	13	63	−05	−10	09	06
Heart Rate	30	39	16	14	48	−19	03	06
Heart Rate Variability	−02	12	−11	20	20	11	08	42
Respiration Rate	45	−15	−10	03	12	−15	−05	−11
Injection of Curare, Presence of	−11	01	10	−32	14	−07	53	05
Frontalis (median) EMG Tension	−05	−21	21	−05	12	−21	−12	26
Trapezius (median) EMG Tension	32	11	29	28	02	−19	43	47
Biceps (median) EMG Tension	−04	−10	−06	−13	−37	−17	17	02
Quadriceps (median) EMG Tension	05	01	−06	21	27	−22	40	35
Frontalis (3rd Quartile Deviations)	−00	−03	−14	15	24	−19	−14	−03
Trapezius (3rd Quartile Deviations)	−04	−00	18	−05	16	06	32	22
Biceps (3rd Quartile Deviations)	06	06	16	12	01	06	11	24
Quadriceps (3rd Quartile Deviations)	−15	16	04	34	18	−07	26	30
Ceruloplasm	02	10	24	20	45	−15	07	40
Nitrogen PN	−16	13	−07	−13	−04	39	−02	−23
Urea	−06	01	−05	−01	−17	44	14	−23
Urea-NPN	−03	22	−09	−22	07	−04	−17	−15

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*These data were possible only through the generous and effective cooperation of the investigators listed. They will be publishing their own reports as it is collated with results from an extensive series of ongoing research at the Institute for Psychosomatic and Psychiatric Research and Training, Michael Reese Hospital, Chicago, Ill. The present authors assume sole responsibility for the interpretations offered in the accompanying text.

**The values for all variables in the first group, Interview Stress through Respiration Rate, were obtained from direct factor analysis with oblique simple-structure rotation; specifically, they are correlations with reference vectors, as are the data elsewhere in this book, except as otherwise noted. The values for the Presence of Injection of Curare and those below it were correlations with factor estimates by extension analysis (see p. 29).

TABLE 10–4

The Physiological Pattern Finally Inferred for Anxiety as a State

*Physiological associations are listed in approximate order of degree of association and degree of confidence in confirmation. The main sources of direct evidence are indicated in parentheses.

Associated with Increase in Anxiety (State)

Increase in systolic pulse pressure (R3, MR, W and MM studies)
Increase in heart rate (MR, MM, TD, W)
Increase in respiration rate (MR, TD)
Increase in basal and current metabolic rate (W)
Increase in phenyl hydracrylic acid in urine (MM)
Decrease in electrical skin resistance (R3, W)
Increase in hippuric acid in urine (MM, Basowitz, Grinker, *et al.*)
Increase in 17-OH ketosteroid excretion (MR, W, MM, TD)
Decrease in alkalinity of saliva (R3, W)
Decrease in cholinesterase in serum (W)
Decrease in neutrophils and, less clearly, eosinophils (W, Grinker)
Increase in phenylalanine, leucine, glycine and serine (MM)
Increase in histidine in urine (MM)
Decrease in urea concentration (MM, MR)
Decrease in glucuronidase in urine and in serum (TD)

At lower levels of association and/or with less confidence, we can add to the above: *Increase* in body temperature, general corticosteroid excretion, sodium in serum, red cell count, volume of saliva secreted, and, possibly, palmar sweat. *Decrease* in blood glutathione, alkalinity of urine, phosphorus and potassium in serum, staff neutrophils in white corpuscle count. *Increase* of hand tremor and of tension in trapezius (EMG), but *decrease* in involuntary muscle tension in arm, and in handwriting pressure exerted.

Split

With this overview, it is now proposed to summarize in Table 10–4 our picture of the physiology of Anxiety as a state. This summary is at once a statement of confirmed findings and a summary of less confirmed findings needing to be considered as a hypothesis of pattern for some final, independent check. It aims to give maximum guidance to present theory and future research, distinguishing Anxiety from Stress, Pathemia (general frustrated emotionality of response), and other factors we have set aside as distinct patterns, of interest in themselves, along the way. The table attempts to indicate levels of confidence; showing what is relatively confirmed but also, as suggested above, pointing to hypothetically interesting connections based on a single substantial experiment or on indirect evidence.

Colloquially, one could say this pattern fits most pre-existing and popular conceptions of anxiety as a state of being "hot and bothered," "tremulous," and "in a sweat," except possibly in regard to the greater output of saliva which is contrary to the popular idea of "dry mouth" (which may be more a feature of Pathemia, fear or stress).

However, we are not so much concerned with the mere justification of our pattern by matching the popular label of anxiety but rather with the insights into the physiological mode of action of anxiety which this pattern may suggest to the experienced physiologist. At this point, in studying the list, both physiologist and psychologist may need to be reminded that Anxiety is not known only by what loads its pattern, but also by what it does and does not share with other patterns. For instance, one might easily assume in univariate experiment that a state which displays a fall in serum cholinesterase is anxiety, unless one noted that the Torpor (parasympathetic vagotonic, cholinergic) state does the same.[7] Again, it would be a mistake, conceptually and in experiment, to assume that 17-OH increase means Anxiety, for the factor patterns show that Effort Stress (P.U.I. 4) shows even more; or that eosin and neutrophil drop is a measure of Anxiety, unless one keeps in mind the fatigue factor and the basophil-neutrophil response pattern mentioned above. Let us therefore, to understand the role of Anxiety and other neurosis-contributory factors, examine these other patterns.

Physiological Patterns of Effort Stress, Fatigue, Torpor, Adrenergic Response, and Similar Malergic States

After singling out the states of Anxiety (from the background of other states which are simultaneously oscillating) and defining more clearly its essential nature as above, it behooves us to contrast it with other state patterns. We propose to do this by dividing them into two groups: considering in this section, the response patterns that have the general character of stress, and fatigue, and autonomic adjustment and, in the following section, less immediately physical response patterns, which have the character of being related to more long-term neurotic maladjustment. Although this division seems to us a natural and fairly fundamental one, we shall not stop to dwell on its meaning—except to suggest that the states segregated in the present section are (a) concerned more with somatic wear-and-tear, (b) normally quite temporary and subject to automatic repair, (c) associated with at least partly known autonomic or hypothalamic mechanisms.

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[7] Note, also, its appearance in the Pathemia or depression-frustration pattern, P.U.I. 2, and, of course, in purely physical disorders in connection with liver upsets. (Perhaps this accounts for the association of depression with liver disorders.)

Table 10-5 sets out the definition of the patterns of the first kind as found in the first four or five studies using P-technique. It suffices, perhaps, to give a first proof of their existence and form in this medium of statistical expression. Table 10–6 does the same for factors considered in the next section, the neuroticism-contributing states, but no sharp line exists, other than for convenience, between Tables 10–5 and 10–6.

About general diurnal fatigue, sleep, and its hypothalamic mechanisms we shall say nothing, since this response pattern is a well-known object of study by psychologists and physiologists. Its loading pattern is set out in Table 10–5 simply to remind us that it does account for some of the variance of variables in white corpuscle count, electrical skin resistance, etc.

Perhaps most important among these related states is that which has been identified in our earlier work as the Adrenergic pattern, P.U.I. 5. It is considered Adrenergic in that the presence of adrenalin can be inferred from the combination of high blood sugar, rapid pulse, high diastolic pressure, high erythrocyte count (and, presumably, if further variables were included, briefer time of blood clotting, dilation of the pupil, dilation of bronchi, etc.). If our experimental work is sound, this is clearly distinguishable as a separate factor from Anxiety and Stress defined as above.[8] Our finding of independent factors does not, however, preclude the conception that some regular response sequence of this Adrenergic reaction and our other factors occurs in a single, larger, second-order process. Admittedly, clinical opinion since Cannon (25, 27, 123) has customarily been inclined to assume that anxiety also meant adrenalin secretion, though the mass of evidence tied it only to pain, fear, and rage. Admittedly, also, even though we reject the idea that the Adrenergic response is in any way identifiable with our Anxiety (U.I. 24, P.U.I. 9) pattern, certain correlations and interactions can be found among the Anxiety (P.U.I. 9), Stress (P.U.I. 4), and Adrenergic (P.U.I. 5) patterns, analyzed in a later section.

Our present concern remains, however, to achieve as clear a conception as possible of their descriptive differences and the evidence for their primary independence. The Adrenergic pattern is certainly readily distinguished from Anxiety, both in Table 10–5 and by the special case of Table 10–3, where it can be seen, additionally, that the Adrenergic response, like the Stress response, tends to be triggered slightly by the interview stress, while Anxiety is not but apparently depends more on inner disturbances. The Adrenergic response, incidentally, appears

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[8] Parenthetically, a low blood sugar count is seen in the parasympathetic factor, P.U.I. 1, the existence of which is taken as part of the total grounds for considering P.U.I. 5 to be the Adrenergic pattern.

TABLE 10-5

Summary of Physiological State Patterns of Effort Stress (P.U.I. 4+, U.I. 26+), Fatigue (P.U.I. 3+), Adrenergic Response (P.U.I. 5+), and Torpor (P.U.I. 1+, U.I. 35+)

	Variable Title	Studies*	C′1	C′2	W	H	R3
	Small size of myokinesis		40	36			21
	Low lymphocyte count			42	22		
	Low sway suggestibility		35		11		12
FFORT RESS U.I. 4+ and I. 26+	Small PGR deflections		09		22	05	13
	High 17-ketosteroids				97		
	High cholinesterase in serum				38		

Table 10-2 and Table 10-3 data also indicate the following less confirmed or low loading variables: higher arginine, higher sodium excretion, greater heart rate variability, higher calcium and magnesium excretion, higher diastolic blood pressure, lower glutamic acid, higher total protein.

		C′1	C′2	W	Ka
	High ratio warned/unwarned reaction time	34	47	14	
	High calcium in serum		42	18	
	Recorded urinations		41	60	
TIGUE U.I. 3+	Low % lymphocytes		36	(09)	62
	High % neutrophils		28	(15)	71
	Large upward drift or high original level of GSR resistance	40	40	(01)	
	High white corpuscle total		35	37	

		C′2	W	Ka	H
	High % lymphocytes	48	48	49	
	Small % neutrophils	30	67	52	
	High glucose in blood	34	54		
REN- GIC ATE U.I. 5+	High ratio warned/unwarned reaction time	55	(03)		14
	High calcium in serum		16		22
	High erythrocyte count	(05)	09	44	

The MR study also suggests the following less confirmed or low loading variables: higher systolic blood pressure, higher diastolic blood pressure, higher ceruloplasm, higher heart rate, higher heart rate variability.

		C′1	C′2	W	H	R3
	Large PGR deflections	73	68	50	84	32
	High initial GSR resistance		40	45	67	19
	Low glucose concentration in blood		53	40		
	High GSR upward drift in relaxation	39		38	60	04
	Short dark adaptation		38	49		
RPOR U.I. 1+ and I. 35+	High ataxic sway suggestibility	75		15		31
	High volume of urine per day			60		
	Low cholinesterase in blood			56		
	Small lag of flicker fusion thresholds			50		
	Overestimate length of fear periods					39
	Slower tempo of leg-circling					30
	Lower average handwriting pressure					28
	Slower irregularly warned reaction time					27
	More involuntary muscle tension in right arm					21

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*The designations C′1, W, H, etc., refer to specific research studies, described under these designations in Appendix I. The exception is the Ka study by Karvonen, which is fully reported elsewhere (38, 128) and not discussed in Appendix I.

actually somewhat negatively loaded in corticosteroids in Table 10–3, although slightly positively if we were to accept the long-shot identification with the urinary electrolyte factor in Table 10–2. However, an intriguing problem arises here. The Adrenergic pattern in Table 10–3 resembles the classical pattern in Cannon and Rosenblueth (25, 27) and similar research, both in itself and in being, in some experiments, at least, a response to actual stress, pain, or terror, as well as being characteristically of short, emergency duration. However, if our present identifications are correct, our P-technique studies introduce an entirely new concept here, namely, that the stimulus situation need not be only pain, rage, etc., but can also be, in lesser, moderate ranges of adrenal functioning, vigorous interaction with the environment of a nominally pleasant kind. For example, in our studies, the Adrenergic response appears (admittedly in somewhat introverted subjects) during lively social interaction with other people when there is also pressure of activity. (It is noteworthy that in one case, a stutterer, it increased as stuttering increased.) There was certainly no overtly discernible rage or fear in these Adrenergic phases in these cases, and the question must seriously be raised whether such lively, competitive, emotional involvement, rather than anger, is the normal stimulus to adrenalin variations within a socially normal, or moderate range of variation, such as is observed in everyday conditions.

Another reason for not regarding the Adrenergic pattern as centrally important for psychologically malergic states or typical neurotic process states is that we have not found any factor of this kind to differentiate normals from neurotics, nor even any corresponding factor pattern in the realm of relatively permanent traits.

What is most needed at this point is a P-technique study concentrating on Anxiety (P.U.I. 9), Stress (P.U.I. 4), Adrenergic response (P.U.I. 5), Torpor (P.U.I. 1), and Pathemia (frustration-depression, P.U.I. 2) responses over short periods, for example, one hundred measures at hourly intervals, except for sleep. Thereby, we could hope to determine, more exactly than at present, the existence of any tendency to response sequences to stress or aspects of stress, and also systematic correlations in response at a given moment among the factors. For, on present indications, a likely hypothesis would be that a second-order factor would bind Anxiety, Stress, and the Adrenergic response, perhaps with some additional, especially intimate sequential relation of the Stress and Adrenergic responses, as proposed in Selye's first and second phases (199, 200). Some preliminary evidence on these correlations will be given in the final section of this chapter (page 234). Meanwhile, the contention from the evidence up to this point is that a unique Adrenergic factor pattern can be distinguished, marked by increased pulse rate, lymphocyte and erythrocyte count, blood pressures, neutrophil drop, and glucose concentration, and differing from any pattern on similar variables found in Anxiety and Effort Stress.

Having dealt with the Adrenergic pattern, we shall now concentrate on the more complex issue of distinguishing Stress from Anxiety and from the Adrenergic response. The developing discussion has already gone far to distinguish Stress from Anxiety, and Table 10–5 contrasted with Table 10–4, should bring out in summary the points of distinction. Let us discuss this in the light of the concept of Selye's (199, 200) General Adaptation Syndrome response which has for several years been defined clinically and studied experimentally. Some have found this pattern, centered in ACTH and corticosteroids, as general as Selye hypothesizes it to be, while others, like Mefferd, have concluded experimentally that the pattern varies so much with the type of stress stimulus (157) that to talk of a single general adaptation syndrome to stress stimuli may be incorrect. Our response to this has been that while we accept Mefferd's evidence and agree that Selye's methods are not mathematical enough to substantiate a precisely defined pattern, still the G.A.S. may be a second-order factor, in which the more consistent unitary Effort Stress response combines with other reactions according to stimulus circumstances.

The preliminary evidence in the last chapter initially indicated that Anxiety and Stress are distinct psychological states. Here the physiological variables continue and complete the distinction. Nevertheless, it can perhaps be said that the Anxiety and Stress factors are more physiologically than psychologically alike. Thus they are rivals for the title of the factor having the highest loading on corticosteroid excretion and though Stress tends consistently to have the higher loading in total corticoids there is some indication that Anxiety is relatively or absolutely higher on the special 17-OH ketosteroid fraction. They also have slight overlap (not enough to be called cooperative, see p. 488) on such variables as reduction of white cell count (but different forms), increase of pulse rate, ratio of free to total cholesterol, psychological test-measured anxiety (much greater on the Anxiety factor, however), trapezius muscle tension, and, very slightly, systolic and diastolic blood pressures. Even in the physiological field, however, things in which they are similar are really but a fraction of the spectrum. Doubtless, too, there are many variables yet to be found peculiar to one and not the other. There are instances of opposite loadings, notably glutamic acid in urine (tending to be high in Anxiety, low in Stress as in Table 10–2) and cholinesterase (low in Anxiety and high in Stress). Slighter reversals occur in that Anxiety slightly increases P.G.R. deflection, more definitely increases respiration rate and raises red cell count. The two factors show a decided difference in the protein picture, Anxiety associating with hippuric acid excretion and Stress with increase in arginine.

We have already dealt, in passing, with the apparent difficulty in hypothesizing a unitary character for the Effort Stress response factor, namely, that sometimes this physiological pattern (38, p. 327) occurs with psychological ratings of concentrating, showing persistence, and an actual higher psychological performance, while, at other times, it appears with inability to cope with circumstances, poor performance, and many signs of suppressed emotional reaction to failure. What is common to both, however, is a strong effort to cope—successful or unsuccessful according to individual abilities and environmental demands. There is a discrepancy between the desired and the existing degree of adaptation, but never a passive giving-up. Accordingly, we shall retain Effort Stress—designating maximum willed mobilization either of control or effortful persistence as the essence of this factor. In some experiments, the pattern shows control of emotion, anxiety, fear, anger, etc.; in others, control and concentration on difficult physical or mental performance; and, in still others, coping with an onslaught such as interview stress. Beam's work (12) suggests that the state of Effort Stress when combined with high Excitement (P.U.I. 1—) brings poorer serial learning and more errors, but that learning in the sense of conditioning is greater in these excited states. So much for the factor itself; its possible relation to another stress factor, broader than Effort Stress, is considered in the final section of this chapter, "Possible Mechanisms in the Physiology of States."

Physiological Patterns of Some More Complex States of the Neurotic Phase

The last pattern in Table 10–5, Torpor, has been considered an autonomic state and we see no reason to change that interpretation. However, its discussion has been transferred to the present section, dealing mainly with neurotic states as listed in Table 10–6, because it straddles our two tentative classes. From its nature we have called it, descriptively, Torpor (Unreactiveness *vs.* Excitation), and it appears to match an R-technique trait factor, U.I. 35, Long-Circuiting, inferentially believed to be high in neurotics. At its first discovery (38, p. 322), we argued that this factor represents the cholinergic or vagotonic factor, and, on physiological grounds, there seems no reason whatever to change this conclusion. The factor loadings include the recognized textbook low cholinesterase, large PGR response, high volume of urine, large skin resistance rise in relaxation, and low blood sugar. The pattern subsumes certain univariate associations found by several investigations, notably, Darrow and Heath's pattern (78), Wenger's (220), and one of Freeman and Katzoff's patterns (94). (These three, experimentally fragmentary patterns were, we believe, identified incorrectly by some with the general autonomic activity pattern.)

Although the theory that this represents a state of parasympathetic predominance and sympathetic unreactiveness is very promising, it would not be correct to make this identification with confidence until more physiologically known parasympathetic variables have actually been included in a factor analysis. Some may think that the high PGR response belies its title of Torpor, but one must remember that the large response to threat occurs precisely because the individual, like a sleepy or intoxicated person, will not react at all to anything short of physical insult, and after gross reaction he quickly returns to his high resistance. It is a pachydermatous or inhibited, or refusal-to-react factor, but why this might be associated with neurosis (through U.I. 35) is not self-evident. Our best hypothesis is that a predominant vagotonia—a refusal-to-play—is one possible end response to a long series of frustrating experiences. If it is a refusal to battle the environment with continued sympathetic system reactivity, acting as a retreat from emotional involvement, it should be high in both neurotics and schizophrenics. An alternative possible explanation is that certain individuals are constitutionally set to react little, and that this prevents their overcoming obstacles and multiplies internalization of conflict. But this is less likely, and the notion of an increasing inhibition of emotional involvement as a result of unrewarded direct emotional expression is preferable. (See the corresponding "Invictus," long-circuiting interpretation of the related trait, U.I. 35.) With this interpretation, it becomes especially important to distinguish, and be explicit about, the relation between this state and the Pathemia state, P.U.I. 2, which it much resembles and which is discussed below.

Of the remaining four states, considered in Table 10–6, three must be denoted neurotic, malergic (or neurotic phase) states because there is every evidence that they correspond to the neuroticism-contributing traits U.I. 19—, 22—, and 23—. The status of P.U.I. 10, coresponding to level of activity of Rigid Superego (U.I. 28), can be malergic or not according to circumstances.

As to P.U.I. 2, it has already been hypothesized that it corresponds to an emotionality of frustration rather than to pure depression. At the opposite or elation pole are psychological qualities of keen, calm zest, perhaps most aptly expressed in Browning's "God's in his heaven. All's well with the world." The expectation has already been stated (44, p. 669) that from past experiments and considerations a second, more pure elation dimension will at some time be confirmed in this general domain, but at present we have a single factor of massive variance expressing elation and alertness (with good general behavioral performance and, especially, speed). The turgid emotionality of the depression-frustration state is not accompanied by vigorous impulse, but by general slowness, defective spontaneity, and low fluency. The associated physiological conditions are, as seen in Table 10–6, low body temperature, low muscle tone and lack of tremor, alkalinity of saliva, little GSR conditioning, and a number of less certain associations (slower EEG rhythm is suspected), but with some higher 17-OH ketosteroid excretion. (In the factor tentatively matched in Table 10–3 with this P.U.I. 2 pattern, anger and depression, as rated by observers, are higher than anywhere else, but, the 17-OH corticoids are not indicated as they are in the Table 10–6 data.) The best conceptualization is of a depressed, inward-turned emotionality, probably paradoxically slightly raising corticoids, while otherwise dropping the whole physiological activity level, including metabolic rate.

The resemblance of P.U.I. 1, Torpor *vs.* Excitation, to this P.U.I. 2 pattern of depressive-emotional-frustration or Pathemia is appreciable. The danger of their conceptual confusion is considerable by individuals thinking in Wundtian affective terms, especially at the negative poles, where P.U.I. 1— is Excitement and P.U.I. 2— is Elation (serene elation, however). But, fortunately, they are the two state factors of experimentally largest variance and greatest rotational clarity, so there is no possibility that, experimentally, two distinct factors should fail to be verified. P.U.I. 1 is readily theoretically conceived, since it corresponds to the physiologist's vagotonia, but P.U.I. 2, by any a priori conceptions, is a curious mixture of specific depression and the general emotionality of frustration. (One can see resemblances to Burt's "disgust neurosis.") The upshot is hypothalamic withdrawal from cortical, cognitively alert and clear problem-solving to a state "Where but to think is to be full of sorrow and leaden-eyed despairs," as John Keats wrote.

If our hypothesis is correct, explaining the presumed association of P.U.I. 1 with neuroticism as the disabling conclusion of a practice of inhibition of interaction with environment, these two factors are similar both in cause and in effect. The despair of P.U.I. 2 is, however, presumably more of an immediate emotional reaction to a frustrating problem situation, whereas P.U.I. 1 presumably grows more slowly as a more unconscious and deep-seated habit of declining to become emotionally involved as the result of a whole series of such experiences. The resemblance of their effects similarly stops short of completeness, for the P.U.I. 2 gloom and dudgeon slows down all cognitive, cortical processes, while causing (despite reduction of Basal Metabolic Rate) some slight increase in certain autonomic and hypothalamic disturbances, notably a raised corticosteroid level and pulse rate (see Tables 10–3 and 10–6). On the other hand, the frigid pattern of P.U.I. 1 extends to a general shut-down of vegetative processes (high skin resistance, subnormal blood glucose, slower body tempo, lowered cholinesterase, and, if evidence beyond Table 10–5 is admitted, slowed heart beat, etc.).

As to the ultimate physiological effects of P.U.I. 1 and P.U.I. 2 states, there is sporadic clinical evidence, notably of deaths from sudden, severe depression and of ventricular fibrillation from vagal stimulation, which suggest that physiological changes can be considerable (26, 183, 231). However, the clinical data on such powerful psychosomatic effects does not permit decision as to which of our dimensions of depression is operative, though it suggests P.U.I. 1 to be the root of the more radical, physiological upsets. In any case, these considerations lead us to hypothesize that a substantial second-order factor, or, alternatively, some special sequential correlations should be discoverable between P.U.I. 1 and P.U.I. 2.

By contrast to P.U.I 1 and P.U.I. 2, the P.U.I. 8 state, now labelled Ergic Regression (38, p. 332), corresponding to the neurotic opposite of Mobilization, U.I. 23+, has negligible physiological accompaniments. This is surprising, for so much of the behavior in the Mobilization *vs.* Regression factor suggests an almost physical debility, and Eysenck's medical examination reports, at least, include for a similar factor, as clinically rated, low muscle tone and poor posture (86). Our experimental results support these clinical evaluations in that they collect in this factor the chief experimental measures of reduced muscle tension and endurance, namely diminished magnitude in accustomed physical movements, slow reaction time, greater hand steadiness (loss of tonus), little ergometric endurance, and, if our identification is correct with F8 in Table 10–3, fairly large loadings (at the U.I. 23− pole) on diminished bodily muscle tension by myograph. (There is no loading for our ballistic, arm-snatching muscle tone measure; we are convinced that this tonus measure is something quite different from muscle tension in unrelaxed conditions by myograph.)

This evidence of low muscle tension and performance throughout the Regression factor (U.I. 23−, P.U.I. 8−) suggests that our first term for the pattern, on its discovery (38, p. 332), namely, Overwroughtness, may not be the best of titles and we have removed it to the status of a sub-title. For the phenomena are all those of a broad fatigue, resembling but distinct from, and perhaps more deep-seated than, Diurnal Fatigue, P.U.I. 3. The original notion of Overwroughtness came from the discovery of loadings in a tendency to inaccurate but

TABLE 10-6

PHYSIOLOGICAL CONCOMITANTS OF NEUROTIC STATES OF PATHEMIA (P.U.I. 2, U.I. 22−), REGRESSION (P.U.I. 8−, U.I. 23−), GUILT OR SUPEREGO ACTIVITY (P.U.I. 10, U.I. 28), AND SUBDUEDNESS (P.U.I. 11, U.I. 19−)

(Other Less Certain Associations Are Discussed in Accompanying Text)

		Studies (See Appendix I)				
	Variable Title	C′1	C′2	W	H	R3
PATHEMIA P.U.I. 2, U.I. 22−	Long reaction time	75	35	67	21	34
	Slow reversible perspective	43		61	(05)	
	High pH saliva (alkaline)	56	33	10		04
	Low sway suggestibility	02		36		02
	High plasma 17-OH			78		
	Low body temperature				70	
	Slow tempo			66		19
	High white corpuscle count		46			
	Lower amount of GSR conditioning					43
	Smaller magnitude of hand tremor					33
	Lower level of involuntary muscle tension in right arm					33
	More recovery of GSR level after shock			02		30
	More saliva secreted			04		27
REGRESSION OR DEBILITY P.U.I. 8− U.I. 23−	Small movements in myokinesis	44				26
	Slow reaction time	41			14	02
	High steadiness of hand				42	08
	Little endurance on ergometer				29	
	Preference for weaker smells					20
GUILT OR SUPEREGO ACTIVITY P.U.I. 10+, U.I 28	Low critical frequency on flicker fusion			65		
	Small pupil diameter			56		23
	Low initial GSR resistance			50		57
	High specific gravity of urine			38		
	Small PGR deflections			34		00
	Less fidgeting (fidgetometer)					36
	Preference for stronger smells					33
	High level of involuntary muscle tension in right arm					21
SUBDUED-NESS P.U.I. 11, U.I. 19−	Low pH saliva (acid)			80		40
	Short time of dark adaptation			56		
	Low pulse pressure			36		03
	High absolute level of GSR resistance			34		02
	Less increase in heart rate after startle					41
	Lower amount of GSR conditioning					31

rapid skipping in mental performance, from ratings of hectic rather than languid state and of high social interest and forwardness. On the psychological side (see Chaps. 5 and 9), there is a sense of failure in remembering, a high rating of funniness of jokes, high rigidity, and various other signs which aptly fit the popular term "overwroughtness," used to express an over-tired but restless, overactive state with deterioration of judgment and control. However, because this psychological picture goes with a physiological picture of sheer debility, and even relaxedness, and also because of our theory of U.I. 23— as a tendency to general regression of object interests, we shall call this state, as we do the trait, Regression.

The pattern of P.U.I. 10+ is witnessed by only one P-technique (38) and one R-incremental study (65) and is of small variance. Like P.U.I. 1, it has some resemblance to U.I. 35, but we believe U.I. 28 to be the better match. As to the exact pattern, there is agreement of P- and incremental R-techniques on: small pupil diameter (essentially, lack of normal dilation in a moderate stress situation) and low GSR skin resistance—a pairing Woodworth also recorded (232) long ago and to which he applied the term "autonomic reflex." Darling (77) recognized an apparently similar correlation cluster of small pupil size, small PGR response, low sensitivity, high blood pressure, and low alertness which he called "Nervous Disposition." (The blood pressure loading is negligible on our factor.) There is a dilemma also in that the pattern could match, beyond U.I. 28, both U.I. 35 and U.I. 29— among traits. Thus, there is little solid agreement beyond the main pair of variables. Psychologically, the state is one of self-exacting, tense, socially morose behavior, not unlike P.U.I. 1, Torpor (consistent with the possible match with U.I. 35). In view of the presumed association of this state with neuroticism, through these resemblances to traits known or expected to be higher in neurotics, it deserves fuller study.

The last pattern of all, P.U.I. 11, is of smallest variance, but the alkaline saliva, low pulse pressure, high skin resistance, small startle, small conditioning response, etc., agree with the psychological picture (U.I. 19—, trait) of a subdued, resigned, and unextended state, that is, a state of repose. It is understandable that the restless Promethean Will psychological characters of the opposite pole (radicalism, dominance, drive) should produce wear-and-tear, high pulse pressure, for example, and may be considered a malergy; while the P.U.I. 11+ pole of repose would seem scarcely a malergy in the sense of something connected with harmful conditions, though for some reason (perhaps by declining to adapt), it is tied to neuroticism. Again we get an indication that the personality patterns leading to neuroses are actually likely to be the opposite of those leading to damage!

Thus, in retrospect, the states demonstrated by P-technique range from large, well-replicated, and readily interpretable patterns to slighter and more obscure response factors. A further attempt at physiological understanding of the more important of these states and their relations will be made after first acquainting ourselves with the physiological associations of traits, as follows.

Physiological and Somatic Associations of Anxiety as a Trait

We will first study the physical associations of the trait of Anxiety, before turning to those of the less-investigated, neurosis-contributory traits. Somatic connections with Anxiety are best summarized, as to their magnitude and consistency over the ten available studies, by the correlations with the Anxiety factor shown in Table 10–7. This table includes a fair number of physical performance variables from the studies by Wells (We) and by Golding (G) in the laboratory of T. K. Cureton, University of Illinois. Except for Golding's experiment (G in Appendix I) on adult women (averaging twenty-six years of age), the groups are young male adults and, in all cases, the experimenters used a true U.I. 24 measure, not a rating or arbitrary questionnaire.

First, the results show confirmation of the psychological researches indicating slight correlations of Anxiety with general slowness (tempo, reaction time). Second, there is some association with more false reactions to sudden stimuli and with lower hand steadiness (jitteriness). Third, there is poorer general coordination, notably in a wide range of carefully measured gymnastic performances and poorer Schneider cardiovascular fitness indices. These correlations run around 0.2 to 0.3, and, corrected for attenuation would center on 0.4; that is, they are larger than one might expect between a complex emotional condition and gross physical indices. There are also appreciable correlations with higher speed of GSR conditioning and with poor performance in handling numbers and letter perception. Incidentally, more rapid conditioning evidently belongs with Anxiety as a trait rather than as a state, though it belongs more to other factors than either. The decline of perceptual efficiency, so frequently resorted to by various experimenters as an anxiety measure, is poor as a trait measure (because of low loading) and even poorer as a state measure.

A very interesting finding is the correlation of small physical size and muscle girth with Anxiety. Even in civilized society, it would seem that Anxiety as a trait is bound up either with constant relative vulnerability to physical threat, or with inability to make that social impression which depends on presence. In extenuation of our culture

TABLE 10-7

PHYSIOLOGICAL, SOMATIC, AND PHYSICAL PERFORMANCE VARIABLES CORRELATING WITH THE U.I. 24 ANXIETY TRAIT FACTOR (In Adults)

MI* No.	Variable Title (In High Anxiety direction)	Studies (See Appendix I)								
		C5	C6	ROS	R1	R2	R4	We	G	MC
468	Low hand steadiness, high tremor			22	05	04				
560	Can do few chins, vertical jumps, and dips (young adult males)							31		
307	Slow speed in letter comparison	13	17							
308	Slow speed in number comparison	18	03							
178	Slow reaction time: irregularly warned	06	11	06	22	06				
269	Slow tempo in leg-circling	(04)	(03)		29	20	15			
40	More response to false signals in reaction time	14	10							
487	Smaller girth and length of bones					28		04	10	
486	Smaller girth and length of muscles					22		02	05	
559	Poor performance on Cureton motor coordination test (young adult males)							27		
470	Faster rate of GSR conditioning				25					
620	Increase of pulse rate to cold pressor "stress"								70	
622	Increase of pulse rate to shot startle								74	
621	Recovery of pulse rate after cold pressor "stress"								50	
623	Recovery of pulse rate after shot startle								46	
625	Little response lag to cold pressor "stress"								30	
624	Little response lag to shot startle								64	
73	Low Schneider Index					04		05	25	
629	Little absolute rise in capillary resistance to cold pressor "stress"**									19
630	Little % rise in capillary resistance to shot startle**									27

Other possible associates, confirmed less directly, are: higher hippuric acid excretion; higher total amino acids in blood plasma; possibly, lower glutathione; possibly, lower glycine; greater susceptibility to photic driving of EEG; longer latency of true pain response; possibly, quicker reaction to imaginary pain; possibly, greater muscle tension.

*Master Index Number identifying objective test variables according to system employed in this laboratory.

**This was measured by Dr. Gordon McMurray (MC, in Appendix I).

it must be remembered that perhaps the association is most built up over boyhood! There is also the possibility that some argument could be made for the opposite direction of causal connection—with Anxiety reducing muscle size, since the breakdown of glutathione in blood serum would favor catabolism of muscle protein and reduction of muscle size in the Anxious person—and small muscle size is most correlated with high Anxiety. Finally, we note one of the largest correlations of Anxiety yet found with physiological responses—namely, between Anxiety and the magnitude and quickness of the pulse rate response to the cold pressor test or to sound startle. This perhaps only verifies the popular perception that anxious persons startle easily![9] It would be interesting to determine the relative loading of this startle in the state and in the trait Anxiety factors.

If we are to confine discussion to evidence on the precise U.I. 24 trait (and state), this is as far as we now can go in describing physiological associations known for Anxiety as a trait. But if we risk entering the considerable array of experimental work hinging on unfactored questionnaires and symptom lists, or even ratings and ill-defined general situational stress stimuli, we can glean other indications. We do so, of course, at the cost of being unable to say positively that they belong to Anxiety rather than to Stress, or to Debility, or to asthenia responses. Also, we cannot reach any accurate correlation values. For example, the work of Ulett *et al.* (217), using the Saslow Scale, shows a significant tendency for the photic driving of the EEG alpha rhythm to proceed more readily with highly anxious subjects.

In this case, the correlations with U.I. 24 of the anxiety measurements used are good enough to permit reasonably confident inference that this is a true U.I. 24 physiological association, but elsewhere there are some interesting possible physiological studies in which inference must rest merely on life situations deemed to be anxiety-provoking. Standing out from other studies, by reason of adequacy in size of samples, imaginative experimental design, and effectiveness of stimuli and physiological measures, is the work of Basowitz, Grinker, and their colleagues (10). This has already been considered regarding evidence on Anxiety as a state, where the additional collaborative stimulus-controlled P-technique was discussed; but the present consideration turns specifically to their earlier evidence on anxiety as a trait (10,

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[9] Shakespeare's Macbeth noted that there was a time, presumably when he was anxious and guilty, when his hair would stand on end at a startling noise, but after he had "supped full with horrors," and presumably discharged his anxiety, this ceased. The possibility should be considered that the liveliness of the Adrenergic (fear-anger) response is greater when the (independent) Anxiety factor is at a higher level. This is not a second-order factor relation, but would need special experimental investigation correlating rate of change of one with absolute level of the other.

105). As noted, they showed higher than normal hippuric acid excretion to obtain in anxiety neurotics (note that our anxiety factor is also higher in anxiety neurotics, Chap. 7), and in soldiers rated higher on anxiety, or as more prone to anxiety characterologically. Also, among the paratroopers in training, individuals who later refused to jump from a plane were higher (on pre-test) in hippuric acid excretion and total amino acids in the blood plasma, but lower on glycine and on glutathione. (If substantiated, this would suggest that the raised glycine indicated in Anxiety states over a few days or weeks, which is a response to the need for raised glycine with raised hippuric acid excretion, cannot be maintained when Anxiety has the permanence of a state. At least, it is worth investigating the probability that glycine is an element of the pattern that behaves differently in short and in prolonged anxiety conditions.)

In summary, we conclude that there are constant physiological differences distinguishing individuals high in Anxiety as a trait from those low therein. These differences seem mainly, to be the same as those associated with Anxiety as a state, but unfortunately, no overall comparison of the physiology of state and trait would be profitable at this time, since the same variables have not been systematically tried out in comparative studies. However, we can summarize that autonomic, BMR, glandular, and cardiovascular deviations seem less prominent in the trait, though susceptibility to marked change in these measures when threatened is part of the trait. On the other hand, slow tempo, physical performance deficit, and, of course, diminutive body build, do not seem to associate with the state.

Physiological and Somatic Associations of other Neurotic Traits

Again, it has seemed best to summarize these more peripheral and numerous traits in a single table, Table 10–8, with relatively little discussion because, as yet, the evidence is not sufficiently marshalled to permit integration of conclusions in single concepts, except in a few cases. Table 10–8 summarizes from a previous book (44), from two subsequent R-technique analyses on eighty-six cases (67, 192), and from Wells' study (219) some important associations which have been found for the six main neuroticism-contributing factors, excluding Anxiety. With Premsia, U.I. 16—, as with Anxiety, we note the effect of small physical size. It favors accepting the dependent, overprotected role and opposes the acquisition of that independence of will which we have called Harric Assertiveness, U.I. 16+. However, unlike its associations in the Anxiety pattern, the small size, etc., here go with passive acceptance, slow tempo, and lower pulse pressure.

The finding of a smaller T-wave in the ECG with the inhibited personality, U.I. 17+, is new and deserves checking. In this younger age group, the deficiency of power of this wave impulse can scarcely be due to coronary trauma and, since U.I. 17 is appreciably constitutional, a possible hypothesis is that we are encountering an important inherited physiological element in this total timid-inhibited constitution. (Since, through the H— correlation with U.I. 17, the T-wave difference would be associated with inhibition also in contacting the opposite sex (44, p. 192), possibly we have literal indication that "faint heart does not win fair lady!") This finding can be constructively related to the recent studies of electrocardiogram changes by Stevenson *et al.* (209), Graybiel *et al.* (104a), and others. These show reduction of T-wave in the same individual in interview stress and after strenuous exercise. Since our interpretation of the H— personality factor (and, in part, of U.I. 17+) has been that it is a constitutional autonomic and general susceptibility to threat, as symbolized in our title Threctia, the constitutional and environmental explanations are not necessarily incompatible. For the average, everyday buffets of life would continually keep the H— or U.I. 17+ person in a state of stress reaction, relative to the H+, or average H score person, accounting for the diminished T-wave constantly found in him as a trait. The higher handwriting pressure possibly suggests some tension along with the U.I. 17, Inhibition.

On inspecting the Resignation, U.I. 19— pattern, one gets the same impression as with the state (P.U.I. 11, see p. 219), namely, of a physiological repose. The notion of a resignation to events, present in the psychological attitudes and behavior, is not inconsistent with the physiological picture.

The intriguing counterpoint of U.I. 20, Comention, specifically to U.I. 24, Anxiety, as shown originally in their parallel, objective, personality test loadings (44, pp. 245–255), persists as a cooperativeness, in factor analytic terms, also in the physiological realm. For Comention shares with (state) Anxiety the determination of most of the variance in GSR conditioning which has yet been accounted for experimentally. But whereas Anxiety speeds conditioning, Comention—which is otherwise generally cooperative and which we have considered as a possible pattern of bound or, at any rate, unconscious anxiety—reduces the amount of conditioning. Physiologically speaking, Comention, like Resignation, gives an impression of repose; indeed, it has several such variables in common with Resignation and, also, lack of inhibition of salivary secretion, which may fit the same concept.

Except for the absence of fidgeting (which may, after all, not be a sign of energy), the Exuberance factor, U.I. 21+, has a physiological substrate agreeing with its psychological nature. Indeed, the positive and appreciable correlations with high basal metabolic rate, systolic blood pressure, etc., deserve to be more exactly determined for theoretical ends. For in view of the rapid decline of Exuberance over the early years (44, p. 617), the whole dimension might turn out to be one of metabolic rate, or, at least, the metabolism rate within the tissue of the central nervous system. A defective rate, U.I. 21—, as found in our neurotics, would presumably favor neurosis in the sense that any defect of brain metabolism is liable to produce misperception, poor integration of experience, and maladaptive response.

It will be recalled that Pathemia, U.I. 22—, as a state has been considered psychologically as an elated-serene-success mood as opposed to a particular reaction to, or quality of, frustration in which, though anger and anxiety may have some role, the main ultimate response is depression and perhaps disgust. (Perhaps "Chagrined" most accurately describes the pattern we seem to find.) In Table 10–3 the factor identified as Pathemia shows some slight positive association with raised blood pressure and pulse rate, but the evidence in Table 10–8 suggests only a general retardation, such as has always been clinically associated with depression. Since depression is clinically known to be associated with physiological change, and, as stated above, a few instances are on record of death from sheer depression (26, 183, 231), there is room for far more extensive research on the physiological consequences of extreme shift on this now definitely measurable factor. The notion of raised general hypothalamic (Pathemic) activity with reduced cortical activity, proposed earlier, admittedly does not fit too well with the absence of more physiological associations for this U.I. 22— pattern.

In U.I. 23—, Regression, it has been noted before that sheer cerebellar inefficiency, as shown by ataxia, loads the factor virtually as much as sway suggestibility, indicating that the inability to mobilize, overwroughtness or poor general integration, which we have noted at the cortical and symbolic level, seems to extend through all neural coordination. Although not sleepy (no high skin resistance) or relaxed, the individual shows inefficiencies often associated with fatigue. His large reactions to startle (comparable to, but not identically measured with, those of Anxiety) perhaps also fit this picture of a state of poor coordination. However, it must be confessed that here, as in U.I. 22—, the substantial physiological substrate one would expect to exist has not yet been found. One would expect, on our theory of a general neural inefficiency, that in Regression, U.I. 23—, the sensory absolute and discriminatory thresholds would be raised; that digestive and other purely vegetative functions would also show some incoordination; and that some biochemical subtrate general to all kinds of neural action (acetylcholine) would be powerfully changed. If the identification is correct in Table 10–3, there is indication of significantly raised ceruloplasm in Regression, U.I. 23—, and other associations may exist without being known, mainly because no one has happened to test for them.

On U.I. 29—, the few physiological variables known to have association are such as might exist with a less vigorous willed action, thus are consistent with the psychological picture, but add nothing. (Unless, by the absence of more somatic variables, some confirmation is given to the notion that this is not a constitutional factor.)

A fresh flood of light will be thrown on the above traits, perhaps clinching much that is now speculative, when biochemical measures have been included more systematically in the individual difference studies, as they were in our state, P-technique researches.

From the practical clinical standpoint, it is desirable finally to look afresh at the above physiological associations, so far analyzed out for each factor separately, in terms of the *joint* action of these factors as it occurs in the typical neurotic. By addition of the factor loadings algebraically, we should arrive at the total physiological resultant and cluster estimate of these known neuroticism-contributing or neurotic process factors. In other words, in what total collection of physiological process deviations, would our hypotheses lead us to expect that the neurotic (segregated as a type) would differ from the normal? If we confine ourselves to those variables in which two or more factors cooperate in the neuroticism-contributing direction, then we should record high ataxia (U.I. 16— and 23—); poor two-hand coordination (U.I. 1—, 19—, 23—); high amplitude of hand tremor (lack of steadiness) (U.I. 19—, 20 and 24, *but* not 21— which is reversed); slower reaction time, (U.I. 22—, 24), and slow tempo of tapping (U.I. 16—, 29—). On GSR conditioning there should be no appreciable difference, for U.I. 24 increases its rate while U.I. 20 decreases its amount—which may explain several mutually contradictory results in the literature, in which being a neurotic has been conceptually identified with high anxiety level. On systolic blood pressure and basal metabolic rate, there is similarly an opposition. For they are lowered by U.I. 16— and 21—, but raised by the state of Anxiety. As their loadings on the trait of anxiety are much less, it would follow that in a neurotic in which a temporary state of high Anxiety has been passed by, there would be a tendency to run *low* on systolic blood pressure and basal metabolic rate.

In general, therefore, the neurotic has a tendency to be physically slow, ataxic, given to tremor, and of poor muscular and general coordination. Additionally, there is some probability of his being below average in physical size and muscular development, at least in males (U.I. 16— and 24). However, the physical associations are not high enough for them to be used even as an adjunct to the psychological

TABLE 10-8

Principal Physiological, Somatic and Physical Performance Variables Related to Neuroticism-Contributing Factors as Traits

(Other Less Certain Associations Are Discussed in the Accompanying Text)

	Mean Loading	*Number of Studies with Consistent Sign*
Premsia, U.I. 16−		
Lower systolic blood pressure	41	3
Slow tempo of arm-shoulder swing	40	3
Smaller size of bones or of muscles	58	1
Also, high ataxic sway suggestibility, slow tempo of tapping		
Inhibition, U.I. 17+		
Smaller T-wave in ECG	51	1
Slowness to name objects in dark adaptation	36	2
Large PGR response to threat	18	7
Higher mean handwriting pressure	20	2
Resignation, U.I. 19−		
Much upward drift of GSR (skin resistance) when relaxing	16	5
High amplitude of hand tremor	25	3
High absolute GSR skin resistance level	16	3
Low level of (involuntary) muscle tension in arm	17	3
Also, poor two-hand coordination		
Comention, U.I. 20+		
Lesser amount of GSR conditioning	19	2
Much upward drift of GSR (skin resistance) when relaxing	32	4
Greater volume of saliva secreted (in test situation)	20	2
Rapid appearance of negative after-image	43	1
Also, low level of involuntary muscle tension in arm, and high amplitude of hand tremor		
Energy Deficiency (vs. *Exuberance*), *U.I. 21−*		
Slower basal metabolic rate	34	2
More fidgeting	17	6
Little reduction in myokinesis with threat	39	2
Also, lower systolic blood pressure		
Pathemia, U.I. 22−		
Slow (irregularly warned) reaction time	37	11
Low frequency for flicker fusion	31	4
Low speed of alternating perspective	19	7
Also, less fidgeting		
Regression or Debility (vs. High Mobilization), U.I. 23−		
Larger PGR deflection to mental than to physical stimuli	16	3
More increase of heart rate to startle	21	4
Less change in metabolic rate, with stimulation	65	1
Also, high ataxic sway suggestibility, poor two-hand coordination		
Defective Will Action, U.I. 29−		
Slow tempo of tapping	15	5
Much reduction of cancellation performance by shock	36	1
Also, slower basal metabolic rate		

diagnostic measure, as such, and the principal interest in considering them lies in understanding the relatively specific contributions of particular factors. For this augments our theoretical understanding of the effect of neurosis on the total organism, and, in individual clinical case study, permits prediction and control of specific psychosomatic symptoms.

Relevant Biochemical Observations on Serum Cholinesterase, Nerve Physiology and Protein and Lipid Metabolism

A rough division has been made above (p. 209, and Tables 10–5 and 10–6) between states which involve temporary "emergency" reactions (generally involving the autonomic system and fairly gross bodily response) and states of a more subtle kind, which last longer, have more clearly established connections with the state of neurosis, and so far, except for Torpor, have not had many bodily associations found for them. The subtle states include Torpor, P.U.I. 1, which we presume is associated with neurosis and could hypothesize to exist to a greater extent in schizophrenia; and the obscure malergies and fatigues in Table 10–6, notably Regression (P.U.I. 8); Pathemia (P.U.I. 2); and Resignation (P.U.I. 11). Probably Anxiety itself (P.U.I. 9), as distinct from Stress (P.U.I. 4), can also be included as a subtle, longer-lasting, and not simply physiological state.

As physiological research advances further into the recognition of enzymes affecting the metabolism of the central nervous system, as well as particular areas of the central nervous system, one suspects that the inclusion of such variables in P-technique will bring out the physiological substrates now lacking from the presently definable, general behavior patterns in these states and, perhaps also, in the traits. However, we already have some evidence on one substance of this class, namely, cholinesterase, which substantially loads several of our state factors—a finding which we believe is entirely new. Consequently, in this section we shall attempt to find some order in the degree and direction of these cholinesterase involvements in Anxiety, Torpor, and Effort Stress, and to explore related theoretical possibilities.

ROLES OF ACETYLCHOLINE AND CHOLINESTERASE. Cholinesterase was measured in our studies as a second-best to measuring acetylcholine. Evidence suggests that acetylcholine inhibits heart force and frequency (vagus) (19), contracts bowel muscle, pupil, and bronchioles, and operates (instead of noradrenalin, as might be expected) to stimulate in salivary, sweat, and stomach glands and many blood vessels. It has two distinct actions: (a) muscarinic on parasympathetic nerve endings, and some central nervous system or effects, opposed by atropine, and (b) nicotinic, in its stimulation of autonomic ganglia, opposed by curare.

Adrenalin secretion is one effect of this latter action. The student will recognize that the presently accepted view is that acetylcholine is released at synapses and helps to pass on the stimulation to the next neuron (or muscle). It is very rapidly destroyed (hydrolyzed) by cholinesterase (into acetic acid and choline). Certain chemicals—physostigmine, eserine, Diisopropyl Fluorophosphate, "nerve gases"—prevent this dissipation and, therefore, result in continued, uncoordinated stimulation. The opposed action of atropine, curare, curanine, etc., is not a simple reversal, but a blocking of acetylcholine action by occupying (interaction with) the receptor sites which acetylcholine would otherwise act upon. The terminals of all preganglionic (sympathetic and parasympathetic) and postganglionic parasympathetic fibers are of this acetylcholine-receptive type.

In nervous structures, in the human placenta, and, particularly, in basal ganglia and the sympathetic ganglia, the biochemical choline acetylase system acetylates choline, the resultant acetylcholine being bound in some way. It exists in equilibrium in a three-stage process in which an inhibitor of cholinesterase, not yet fully understood or isolated, acts in the way we know neostigmine, etc. (which are synthetic, noxious substances), to act. There is doubt whether the hydrolysis of acetylcholine is reversible in this situation. However, in this three-state equilibrium the addition of eserine can, for most experimental purposes, be considered equivalent to raising acetylcholine.

$$\underset{\substack{\text{(or neostigmine or}\\ \text{alkyl phosphates)}}}{\text{eserine}} \xrightarrow{\text{inhibits}} \text{cholinesterase} \xrightarrow{\substack{\text{inhibits}\\ \text{(esterifies)}}} \text{acetylcholine}$$

Tissue cholinesterase is actually a mixture of what have sometimes been called true (ChE_1) and pseudo–(ChE_2) cholinesterases. After destruction, plasma cholinesterase regenerates in a few weeks, but red cell cholinesterase reappears only as new red cells are formed. It is ChE_1 that prevails largely in the C.N.S. and in the placenta.

The level of acetylcholine in the brain varies inversely with what would be thought of as "nervous activity." Richter and Crossland (184), for example, found that sleep and anaesthesia increase it, while excitement and convulsants decrease it. Injected into the hypothalamus it stimulates pituitary anti-diuretic hormone and causes hyperpnoea, vomiting, and sweating. Consistent with this view of acetylcholine as participating in, and being used up by, vigorous central nervous activity is the finding that when ChE_1 is inhibited in the cerebrum by DFP there is sleeplessness, anxiety, and nightmares (185), and it is generally concluded that the central effects of the anti-esterases are excitatory.

Speirs and Sullivan (207) showed in rat brain that a sharp rise in acetylcholine was produced by ACTH injection.

In our P-technique analyses of states, cholinesterase loads four factors: Anxiety, *negatively;* Torpor (or Vagotonia) *negatively;* Stress, *positively;* and (possibly) Pathemia-depression, *negatively,* roughly in that descending order. This agrees with the clinical measures of Richter (185a) only if we consider his complex of rated "anxiety," "catatonic condition," and "depression" to equal our Stress, for he found cholinesterase high in all of these (185a). Croft and Richter (76) found a 50 per cent increase of cholinesterase after vigorous exercise, but a decrease after electric shock therapy in schizophrenics—agreeing (a) with our finding of cholinesterase rise in Stress and fall in Depression and Unreactiveness, and (b) with the notion that the cholinesterase level somehow adjusts itself in response to the amount of acetylcholine it must handle.

Unfortunately, nothing is known experimentally about the mutual relations of ChE_1 concentration in serum and acetylcholine concentrations in the C.N.S. One could argue, on present expected mechanisms, to two diametrically opposite conclusions: (a) that the ChE_1 level itself is triggered by the psychological states through some as yet unknown neural response and that acetylcholine level then responds secondarily, being dropped more (by hydrolysis) when ChE_1 is high, and conversely; or, (b) that an adjustive mechanism exists, such as that just discussed, by which, when much acetylcholine has been used up by high C.N.S. and ganglionic activity, the ChE_1 level is dropped, to permit acetylcholine recuperation. The former argument applied to our correlations would imply that the level of acetylcholine must, inferentially, be *lower* in states of Stress and *higher* in Anxiety, Depression, and Torpor. The latter might either lead to the same or to the reverse conclusion, depending on the time lag assumed necessary for the adjustment. Some support for the second mechanism above is provided by a rather general finding in body physiology that increased concentration of many enzyme systems can be "induced" by a persistent plethora of the substrate.

Incidentally, it will be recognized that the approach to an explanation here through acetylcholine is not along the oversimplified lines of cholinergic *vs.* adrenergic, autonomic predominance.[10] Indeed, the Adrenergic response pattern, though recognized in our analyses, appears to have no very direct relation to neurosis and anxiety, except as a more momentary intervening, repeated mechanism. However, the correlation with P.U.I. 1, Torpor, or parasympathetic predominance, fits the cholinergic theory.

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[10] These attempts to explain human temperament in terms of predominance of one system or the other have been more enthusiastically received by psychologists than physiologists and, though mainly abandoned, are exemplified in more recent and sophisticated attempts to explain emotional patterns by "autonomic activity ratios" by Diethelm *et al.*, who hypothesize (81) that anxiety, resentment, and anger are characterized by increased adrenergic effects, and fear by cholinergic effects.

Although the inference from cholinesterase level to acetylcholine level cannot yet be made with certainty, the evidence is in general consistent that raised cholinesterase occurs with stress and vigorous external action and is lowered with Anxiety, Torpor (internal inhibitory action), and Pathemia (including nightmares, etc.). On the first theory stated above we should suppose that acetylcholine is high in Anxiety, Torpor, and Pathemia because these are states of conflict and high internal activity of the C.N.S. On the alternative theory, however, we should have to suppose that acetylcholine is higher in Stress, representing really vigorous adjustment action, and that Anxiety, Torpor, and Pathemia are really states of reduced C.N.S. action associated with depletion of acetylcholine. However, in conclusion, the known small range of acetylcholine variability relative to cholinesterase, together with the demonstrations by Krech and Rosenzweig of greater animal learning performance when acetylcholine is relatively high, incline us to the final hypothesis that the essential association of Anxiety in this area is a high acetylcholine level relative to a fallen cholinesterase level.

PROTEIN AND LIPID METABOLISM IN ANXIETY AND STRESS. Since there is reason to expect that some of the more permanent somatic effects of Anxiety and Stress would be produced by influences on protein and lipid metabolism, increasing attention has centered here in the last few years, though the evidence is difficult to evaluate, because it is in a state of rapid transition.

Attention to the effects on protein metabolism was first provoked by the findings of Grinker, Mirsky and others (171, 172) pointing to acceleration by anxiety of the detoxicating action of the liver on benzoates, with resulting increasing hippuric acid excretion. The frequently clinically observed decreases of body weight with anxiety and stress, as well as our own confirming correlations with muscle size, would also suggest attention to amino acid metabolism. The Basowitz *et al.* findings with parachute jumpers are sometimes difficult to interpret because of unavoidable confoundings of trait and state associations. However, the finding that successful individuals tended to have higher glutathione levels (10, p. 284) while stress characteristically dropped glutathione in anxious individuals is consistent, assuming the more successful are persons to whom the situation presents less stress. Incidentally, the greatest drop occurred ten hours after the focal stress. Plasma glycine and glutathione levels were positively correlated, and Basowitz *et al.* (10, p. 274) suggest that the usual sequence in increasing stress will be: eosinophils disappear; next, glutathione falls; and, lastly, hippuric acid rises.

Nothing in the data we have disagrees with the argument for this sequence, but our separation of Anxiety and Stress state factors, and of a third electrolyte-steroid-urea-flow factor in Table 10–2 (which we believe is possibly Adrenergic), suggests some further structuration of the conclusions. Hippuric acid and phenyl hydracrylic excretion are indicated to be specific to Anxiety. In the sustained Anxiety pattern there is actually a rise of glycine, suggesting its production in response to needs, and the same might be true of glutathione. The Effort Stress pattern also has raised glycine, and, more saliently, raised arginine, but differs from the Anxiety pattern in reducing, rather than raising, glutamic acid (see Table 10–2). The Anxiety factor also shows raised histidine, which, incidentally, has been observed (along with raised histamine excretion) in artificially induced high corticoid level.

Many of these amino acid and amine changes are considered best explained as mobilization effects of the corticosteroids, acting in the liver, and leading eventually to the former being broken down to provide carbohydrates. This action would, of course, in turn be traced to increase in ACTH acting on the adrenal cortex. What remains to be explained, however, is the fact that the 17-OH corticosteroids are common to Anxiety, Stress (and possibly the cholesterol factor, yet to be discussed below), whereas the amino acid changes are partly specific. No discussion of the electrolyte-steroid-urea-flow factor (Table 10–2) will be attempted here (it could be involved in the Adrenergic response), because of too fragmentary evidence, except to point out that the factor also is involved in this area of metabolism. (It is well-known that adrenal corticoids influence sodium—the highest loaded variable in this factor—and thereby indirectly magnesium, calcium, and potassium.)

The relation of lipid metabolism to anxiety and stress has recently come into the limelight of medical research because of its conceived relation to arteriosclerosis and heart disease. In Table 10–3, the fifth factor, about which we have had little discussion, has substantial loadings in serum cholesterol, free or bound, and high pulse rate. It is to be noted that cholesterol (free or bound) does not fall in the Anxiety state factor, and it may be added that in Golding's experiment (Appendix I), where it was very accurately measured as an individual difference variable, it also had no significant relation to Anxiety as a trait. On the other hand, Golding (103) and several other recent investigators (132) have shown cholesterol to fall with reduced fat diet and with increased exercise. If business executives tend to run high on blood cholesterol, the first possibility to be considered is that this is characteristic of a life with an excess of fat diet and a deficiency of exercise! However, certain researches exist, notably the recent Washington study on admirals and generals, the comparison of American and West Indies Negroes, the researches of Freidman and Rosenmann (95), and Groover (106), which point to situational stresses affecting lipid regulatory mechanisms and to rises in serum cholesterol corresponding to stress. Some reconciliations of these findings may be possible in terms of the inter-correlations of the state factors connected with stress. These we are about to investigate systematically in terms of second-order factors, but it may contingently be pointed out that a second-order factor in Table 10–9 strongly ties together the blood pressure, i.e., the presumed Adrenergic factor (P.U.I. 5) of Table 10–3 and the Effort Stress factor (P.U.I. 4). Simultaneously, the cholesterol and Pathemia (P.U.I. 2) factors are tied in another factor, suggesting that cholesterol is raised more in a psychological situation of frustration than in either physiological (Effort) Stress or in Anxiety. This agrees with some recent clinical rating indications that individuals of high drive are prone to raised cholesterol, for these would encounter more frustrating situations. Admittedly, they might also meet more Effort Stress creating situations, but at least we may conclude that Pathemia, and possibly Effort Stress, but not Anxiety, have associations with raised cholesterol (see also Wolf, 231). Possibly the special second-order association of the cholesterol-pulse factor with Pathemia, P.U.I. 2, is really a sequential one due to a high mobilization of cholesterol, followed by deficient consumption thereof in the frustration-depression condition, and an outlet in the new factor. As an alternative, we may suppose that the cholesterol-pulse factor is a distinct way of reacting to frustration, which we may liken to a traffic-light stop, in which dynamic processes are simply cut short by act of will, without the emotionality of the Pathemia response or the anger of the Adrenergic response, yet with physiological consequences of the sudden termination of a discharging drive.

Possible Mechanisms in the Physiology of States

It has been our contention in this and the previous chapter that psychologists who claim that they are investigating "anxiety" or "stress" when they define it only by a particular stimulus, instead of factoring the response pattern, are methodologically astray. Physiologists have increasingly recognized this, as in Stewart Wolf's recent comment (231): "Much of the confusion concerning the role of life stress in disease derives from failure to distinguish between cause and mechanism." Our argument is that the organism has built-in mechanisms, that is, unitary response patterns which, by learning, may be quite variously attached to different causes, i.e., stimuli, concrete and symbolic. For the average member of our culture we can state, typically, a specific combination formula of these dimensions as defining the given response to any particular stimulus. This will be the factor specification equation for the given stimulus-response.

So far our aim has been to discover the primary psychophysiological response patterns—as empirical patterns, with theoretical justifications and connections with previous findings held in quite secondary regard. In any case, the complexity of connections is almost certainly so great that, with present knowledge, nothing but a misleading overall theory would be possible. The paramount research needs at this juncture are: (a) far more data than are yet available on biochemical variables related to measured, individual, psychological differences, measured in terms of unitary, stable personality *trait* factors: (b) multiplication of experiments to include at least a dozen individual P-technique studies (to check typicality of the patterns)—each, first of all, coordinated with an incremental R-technique study; second, covering simultaneously a broad enough array of physiological and psychological variables to permit a comprehensive unified check on what here has been combined inferentially from several studies: third, correlating in the same matrix the stimulus intensities and response magnitudes; and, fourth, proceeding to sufficiently exact determination of obliquities in simple structure to permit confident derivation of second-order factors.

We have made some approach to the requirements of a second-order analysis, and, although we shall be compelled to employ some rough methods (notably the averaging of matrices from different sources), we can conclude by obtaining a preliminary glance at the second-order structure of states. Two studies are available in which, by careful determination of simple structure, the correlations among the primary state factors have been estimated. One is the MR P-technique study of Table 10–3 and the other is the R3 incremental R-technique study (65) partly set out in Table 9–2. They agreed as to signs, but not closely as to magnitudes of r's among the first-order state factors examined, and we had no alternative but to average them, which tends to attenuate the factor loadings of Table 10–9. The analysis yielded four second-order factors, and, of course, the second-order resolution by simple structure is not as overdetermined as one would like, owing to fewness of variables.

For the moment, we shall not consider the third and fourth factors, but conclusions of great importance are shown by the first and second: namely, (i) Effort Stress and Adrenergic response belong to a single larger Factor 1, which carries Anxiety and Torpor at its opposite pole. (ii) An equally substantial second-order Factor 2 is loaded by the Pathemia and the cholesterol factors, and to a slight extent the Adrenergic Response factor.

TABLE 10-9

SECOND-ORDER FACTOR-DIMENSIONS IN STATES. BASED ON CORRELATIONS BETWEEN FIRST-ORDER STATE FACTORS *

First-Order State Factors	Final Rotated Oblique Matrix (Factor Loadings)			
	F1 Adaptation Stress *vs.* Withdrawal	F2 Frustration Response	F3 Physiological Exhaustion	F4 Corticosteroid Output
Anxiety (P.U.I. 9)	−48	05	05	10
Effort Stress (P.U.I. 4)	50	−02	65	13
Adrenergic Response (P.U.I. 5)	38	18	05	−22
Torpor (P.U.I. 1)	−18	02	63	03
Cholesterol-Pulse Rate	−03	58	07	04
Pathemia (P.U.I. 2)	−01	55	−12	−03
Regression (P.U.I. 8)	−05	05	65	−46

	C_F or Correlations Among Second-Order Factors			
	F1	F2	F3	F4
Adaptation Stress, F1	100	25	−35	−47
Frustration Response, F2	25	100	−05	−33
Physiological Exhaustion, F3	−35	−05	100	25
Corticosteroid Output, F4	−47	−33	25	100

*See text, p. 234, for description of source of data and type of analysis.

The first of these more general second-order tendencies we shall call the Adaptation Stress *vs.* Withdrawal response dimension, for therein the individual either meets the stress challenge in the environment, experiencing Effort Stress and Adrenergic system activity, or retreats from it with Torpor and Anxiety (because dangers not faced remain for the future). This comes nearest to being Selye's General Adaptation Syndrome, first phase, at the psychological level. Conceivably, other reactions besides Effort Stress, Adrenergic response, and Excitation response (P.U.I. 1 reversed) cohere in this general adaptation.

The second broad factor we shall call general Frustration Response, sharing anger (Adrenergic response), Pathemia (chagrin, depression), and the cholesterol-pulse pattern—the traffic-light-stop effect—for which little psychological content has yet been discovered. Our hypothesis, stated earlier, is that the traffic-light-stop factor is simply a sudden inhibition of an urgent drive, so psychologically well controlled that neither anger nor depression is measurably experienced, though some physiological equivalent occurs.

With this definite evidence of the broader structural relation of the various responses to challenge and to frustration, it is possible to try out far more developed theories than have hitherto prevailed. The origin of the unity in such a pattern as the Adaptation Stress *vs.* Withdrawal response could be either in a nervous mechanism or in a single master chemical messenger generated it would seem in the hypothalamus by the psychological experience of the adaptation-demanding situation. This chemical messenger could release ACTH, which then sets the well-known chain of physiological events in action.

A difficulty which arises here between our results and the relative simplicity of many present views on stress adaptation is that we distinguish Adaptation Stress and Frustration Response as two separate factors. Furthermore, in our results corticosteroid production is not the central mechanism in Adaptation Stress, for it loads positively both Effort Stress and Anxiety, which load *oppositely* on this factor.[11] Factor 4 in Table 10–9 is loaded by the various first-order factors in the direction in which we know they are loaded with corticosteroid excretion (though the Regression loading is here excessive), and contingently this should be regarded as the adrenal cortex response. The Adaptation Stress Response and the Frustration Response seem best considered as responses primarily in the central nervous system and at the psychological level. Without venturing to a full third-order analysis, not warranted by present data, we may yet note from the C_F matrix in Table 10–9 that the four factors tend to fall into two groups—potentially two third-order factors—one comprising these two psychological and presumed C.N.S. responses and the other, negatively correlated with this first, comprising Factor 3 and Factor 4, Corticosteroid Output.

A search for the ACTH pattern might well be made now at this third-order level, since corticosteroid excretion would then be a subpattern within it. Even in physiological research without statistical methods, it is recognized that the interactions are more complex than can be explained by a single General Adaptation Syndrome. For example, it has been observed that the corticosteroids (17-OH) rise more in trauma than from massive ACTH doses alone, so other connections must operate, in stress, upon the adrenal cortex. The work of Hume (120), Mefferd (157), and others shows similar extra effects on the amino acids. As to ACTH action itself, it has been shown that after prolonged stress, in animals (157), there are changes in anterior pituitary cells (increase in size and in the number of basophils, acidophils, and argyrophils) and hypertrophy of the adrenal cortex, which suggests a rather limited locus of action. The notion that, although the action of emotional stress on the pituitary is "solely through the hypothalamus and pituitary stalk, . . . other stresses affect the anterior pituitary through changes in composition of blood" is also supported by Fortier (93). At present, therefore, it would seem that a complexity is indicated physiologically, more akin to that depicted in the factor structure. What we finish with is almost an alternative between, on the one hand, primarily psychological responses in attempt to adapt (F1 in Table 10–9) and response to what frustration remains (F2 in Table 10–9) and, on the other hand, primarily physiological responses in the corticosteroid factor (F4 in Table 10–9) and the yet mysterious F3, with its strong coordination of Effort Stress, Torpor, and Regression. Conceivably, it is this last pair which represent the ACTH action pattern.

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[11] An explanation of the corticosteroid falling on both sides of this factor is that corticosteroid output is partly a function of Anxiety and partly of Effort Stress in controlling Anxiety or any other emotion.

An answer will only be achieved here by coordination of the present method with several others and, particularly, by supplementing the evidence on simultaneous change of factors, as here, with attempts to determine regularities in sequences. For example, in the 17-OH corticoid actions, as far as the serum amino acid metabolism studied above is concerned, a certain sequence definitely exists, notably in the amino acid production rising prior to rise in hippuric acid and, too, in the breakdown of glutathione to urea and carbohydrates setting up a belated reversal of amino-acid protein synthesis in the body cells.

An outstanding riddle in the above patterns concerns the action of the thyroid. Certain features of the Anxiety response, notably the raised BMR, would seem to justify our conclusion above that the thyroid participates in the Anxiety pattern more than in other general stress responses. It is known that thyrotropic hormone (TSH) and ACTH are mutually inhibitory, and it is supposed that cortisone also inhibits TSH secretion. Possibly this is the mechanism at the root of our negative correlation of Anxiety and the other general stress factors. However, the known tendency of TSH and thyroxin to produce nervous agitation, hypersensitivity, insomnia, physical unrest, rapid heartbeat, and loss of weight suggests a search for association with other personality factors besides—especially those with characters such as Corticalertia (U.I. 22+), Shrewdness (U.I. 18+), etc. Indeed, in view of the known slower change in thyroid secretion, we should be looking here for trait associations as well as state correlations.

As to the long-term somatic effects of prolonged states, the mechanisms are speculative or only sporadically known, awaiting research with unitary state measures, sequentially collected. But it is perhaps not going too far to conclude that the grosser somatic effects of mental conflict, seen clinically, are results primarily of Anxiety and Effort Stress factors, but also of the Pathemia and Torpor malergies, acting through their chronic corticosteroid, peristaltic, cardiovascular, lipid, and amino acid effects. Some role may also be given to the intermittent Adrenergic factor response, which one would expect to appear more frequently in neurotics who, through Pathemia (U.I. 22—), would show more constant emotionality of all kinds.

It is well known that stomach ulcers may be produced by overdoses of corticoids, as when being used for other medication. Possibly the most common psychosomatic disorders, such as ulcers, hypertension, etc., are mostly to be traced to raised corticoids and their effects, though the continual more direct cardiovascular stimulation appearing in Anxiety and Effort Stress must also have its effect. In conclusion, a link must be made here between this and our earlier finding in Chapter 7 of a noticeable difference of personality factor patterns between psychosomatics and other neurotics. Psychosomatics, relative to neurotics, possess higher degrees of control (higher factor C, E, Q_2, and Q_3) and lower Anxiety (see Table 7–1). This suggests that the Effort Stress type of response, rather than Anxiety, would be their more frequent response, and it is this which, as Table 10–3 indicates, is the greater stimulator of corticoids and, presumably, of ACTH. In one major respect the psychosomatics seem to be opposite to ordinary neurotics, namely, in reacting to challenges with Adaptation Stress (higher Effort Stress, lower Anxiety) rather than Withdrawal (F1 in Table 10–9). If it is part of the neurotic personality to be more concerned about life, so that more challenges per day are encountered, then the psychosomatic may be called a neurotic. But, if not, he is the very opposite of a neurotic in his way of meeting these challenges. Our data on personality profiles (Chap. 7) point to a radical difference of profile from other neurotics and suggest that the second conclusion is sound, by which we should cease to include true psychosomatic disorders in neurosis at all—while, at the same time, retaining the hypochondria and conversion hysteria somatic symptoms as true neurotic symptoms.

Summary

1. There are great gains to be made in the psychophysiological area, hitherto so resistive to clear resolution of distinct influences, by the application of multivariate, factor analytic methods, especially

P-technique and Incremental R-technique. However, joint factoring of physiological and psychological variables does not commit one to the view that physiological response factors will always be identical with psychological response unities. In some cases, the P-technique model could be improved by scaling modifications to take account of homeostatic effects, use of lead-and-lag correlations to check delayed causation, etc., determination of simple structure in trends which would permit second-order resolution, and correlation of factors with time.

2. The state factors, recognized in the previous chapter as covering most of the possible dimensions of mood and personality state change. have been shown, by half a dozen independent P-technique studies (one stimulus-controlled) and an Incremental R-technique study, to involve, in most cases, substantial variance also in physiological measures of all kinds. Distinctive patterns simultaneously in blood corpuscle counts, serum and urinary chemistry, cardiovascular measures, pH of saliva and urea, cholinesterase, electrical skin resistance, etc., have been set out for discovered factors of Anxiety, Effort Stress, Adrenergic response, Fatigue, Torpor *vs.* Excitation, Pathemia, and, less definitely, for some more long-term components of the neurotic state.

The Adrenergic response (P.U.I. 5), as usual, is marked by higher blood sugar, erythrocytes, lymphocytes, pulse and blood pressure; Fatigue (P.U.I. 3) by raised skin resistance, lowered white cells (especially lymphocytes), etc.; Torpor (P.U.I. 1) by lowered cholinesterase, raised skin resistance, lowered blood sugar, reduced tempo, but raised involuntary muscle tension; Pathemia (P.U.I. 2) by slowing of most cortical and behavioral performance, rise in 17-OH corticosteroids, slower body tempo and reaction time, and marked increase in alkalinity of saliva; and the Regression (P.U.I. 8—) response, by slowing of reaction time, reduced size of myokinetic movements, and possibly, reduced ceruloplasm and increased urea and nitrogen phosphate excretion. The patterns of *Anxiety* (P.U.I. 9) and *Effort Stress* (P.U.I. 4), more central to our discussion, are summarized below at greater length, but the current practice of treating high sodium, high urea (or urea ratio to creatinine) and magnesium/calcium ratios as indicators of stress reaction undoubtedly mixes Effort Stress, Adrenergic, and Anxiety response patterns, and, furthermore, it mixes them in a way that is not justified by the pattern found for the second-order Adaptation Stress response.

3. One cannot speak of a neurotic state as one can speak of an anxiety state because only some of the factor differences of neurotics and normals occur at all as states rather than traits. We have therefore spoken of these as the neurotic phase factors including Regression (P.U.I. 8— and U.I. 23—), Pathemia (P.U.I. 2 and U.I. 22—), Superego Demand (P.U.I. 10— and U.I. 28), Subduedness (P.U.I.

11 and U.I. 19—) and Anxiety (P.U.I. 9 and U.I. 24). They introduce into the total neurotic phase description (with Anxiety excluded for separate consideration): low cholinesterase, low skin resistance, low body temperature, low muscle tone, alkalinity of saliva, low GSR conditioning, high corticosteroid production, poor posture, slow reaction time, low ergometric endurance, small pupil diameter, higher blood pressure, etc. However, since on some variables they are mutually counteractive, the total neurotic phase physiology would vary with factor emphasis. The large role of Anxiety, especially, would unduly emphasize low cholinesterase, high 17-OH ketosteroids, high systolic blood pressure, etc.

4. Combining all sources of evidence, and therefore resting on a match of factors across studies and some inferential separation of anxiety and stress responses in studies not actually factored, one arrives at an evidentially consistent pattern of Anxiety, as a physiological state, covering: high hippuric acid, phenyl acrylic acid and histidine production, low cholinesterase, high corticoids, reduced eosinophils and staff neutrophils, faster pulse and respiration, raised systolic pressures, lowered GSR skin resistance, low urea concentration, increased sodium in serum and moderate tendency to higher alanine, leucine, and glycine-serine (see Table 10–4).

In Anxiety, general muscular power is lowered, but there are indications of increased tension in the special trapezius muscle group. The Effort Stress pattern differs in having more marked 17-OH corticoid and pulse rate involvement; in having loadings in creatinine and arginine, instead of the amino acids mentioned above; and in somewhat higher glycine-serine involvement, higher urea excretion, and substantial negative loading in glutamic acid excretion.

5. Considered distinctly as a trait, Anxiety has considerable resemblance, in its physiological associations, to Anxiety as a state, but adds certain somatic and performance associations and drops a few state symptoms. Significant associations occur with high hippuric acid excretion, tremor, speed and magnitude of increase of pulse rate to startle and the cold pressor stimulus, little rise of capillary resistance to these stresses, more rapid GSR conditioning, poor motor coordination, poor Schneider Index, slow tempo of larger body movements, slow reaction time, poorer muscular performance, smaller total body size and smaller bulk of muscle. These significant associations in some cases reach a correlation of over 0.70 (uncorrected for attenuation) with the factor measurement. The various loaded variables are explicable, however, through a diversity of causal connections.

6. Significant physiological and somatic associations are also found with the constituent factors in the neuroticism-contributing and neu-

rotic-process groups. Here we note small physical size and smaller T-wave in the ECG, and several other associations which, if Anxiety were not operative, would place the neurotic at a subnormal basal metabolic rate, with lower pulse rate and blood pressure, and with signs of physiological debility, e.g., ataxic sway, possibly even physiological repose. However, a general muscular and coordinative inefficiency is central. An interesting conclusion, regarding the neuroticism factors, is that conscious Anxiety, U.I. 24, increases speed of conditioning whereas Comention, U.I. 20, believed to be related to unconscious Anxiety or tendency to repress, significantly lowers its amount.

7. From a matrix of averaged correlations of first-order state factors, an approximate second-order factorization has been performed. It reveals four broader organizers of response: (a) an Adaptation Stress *vs.* Withdrawal pattern, representing an attempt to face the stress of adaptation with Effort Stress and Adrenergic responses, as opposed to leaving the problem unsolved, with Torpor and Anxiety responses; (b) a Frustration Reaction pattern, showing reactions to frustration by adaptations alternatively in Adrenergic (presumably anger) response, Pathemia (depression) and cholesterol-high pulse response (psychologically without content, but interpreted as a traffic-light-stop reaction); (c) an unknown factor, possibly leading to general physiological exhaustion; and (d) what looks like an adrenal-corticoid secretion factor.

8. Among other things, the above suggests, first, that adaptation reactions are more complex than can be represented by the single General Adaptation Syndrome theory. The person can seek to adapt or not and can, independently, experience greater or lesser frustration. These two responses seem best viewed as primarily neural response patterns, but involving physiological variables. In a third-order analysis, these two would correlate, while the apparently more purely physiological factor F3 and the corticosteroid secretion also would correlate and oppose the two first. Possibly, the second of these presumptive third-order factors is the ACTH pattern, which would fit the physiological finding that even the ACTH axis is not a simple pattern, but has sub-patterns, notably the corticosteroid effects. Second, the antithesis between Anxiety-Torpor and Effort Stress-Adrenergic Response in the second-order Adaptation Stress axis agrees with the theory from personality profile differences that the psychosomatic patient is better conceived as the opposite to a neurotic (Chap. 7), attempting adaptation too strenuously, instead of avoiding it. But the hypochondriac and somatic conversion hysteric symptoms remain neurotic symptoms, needing efficient diagnostic distinction from true psychosomatic symptoms.

Present results lead to a rich theoretical structuring, but indicate an urgent need for continuing both trait and state researches with more varied and accurately measured physiological variables, with sufficient markers to hold the half a dozen primary response patterns already separated, and with sequential studies to confirm their pattern and sequence of action in second-order factors.

CHAPTER 11

ANXIETY AND NEUROSIS AS INFLUENCED BY SITUATIONAL STIMULI, PERSONAL HISTORY, AND THE CULTURE PATTERN

Introduction

Reasons for considering some events and structures as influences, conditions, or "causes." The preceding chapters have established the nature of neurosis and anxiety as response patterns, both as characterological traits and as fluctuating states, both in questionnaires and in objective tests. Now that the major factor-dimensions describing anxiety and neurosis have been established as best they can on presently available evidence, we propose to concentrate on the manner in which these response dimensions can be influenced—the "causes" which determine a person's level and expression of neurosis or anxiety (that is, his values on the neurotic-contributory or neurotic phase factor-profile).

Some personality-related events and structures have potential explanatory significance both as "causes" and as "effects." That is, *to some extent, a given personality structure can legitimately be viewed either as cause or effect, depending on whether we wish to explain the occurence and nature of the structure itself (as effect) or the occurrence and nature of behaviors which appear to depend upon the prior existence of that structure (as cause)*. Thus, in Chapter 8, factors were viewed as influences, while elsewhere we have thought of them as resultant behaviors or "that which is influenced." There need be no inconsistency here, for, once affected and formed by environmental, cultural, genetic, and other influences, personality structures can themselves influence behaviors later in the causal chain. This argument applies to variables as well as factors. Thus, a physiological variable can be interpreted either as cause or effect of the factor on which it loads. Such cause-oriented interpretations of variables have occurred throughout the book, notably in Chapter 10, and could almost as easily have been included in the present chapter. So could similar interpretations of the etiology of a factor; for example, discussion in Chapter 5 of the role of an early, overprotected family environment in producing Protected Emotional Sensitivity (Premsia, I+, U.I. 16−). Later in this chapter some of these cause-oriented interpretations will in fact be recapitulated and incorporated with the new data of the present chapter.

The above discussion has perhaps overemphasized the extent to which an investigator's purpose and viewpoint can determine whether an event or structure is considered as cause or effect. For there are some classes of events which are hardly intelligible as anything but influence or cause. Among this latter class, are included: (a) stimuli, understood as energies delivered at a receptor, (b) broader situational influences, clearly originating in the organism's environment, as do stimuli, but more difficult to define in physical terms, and (c) genetic constitution. Any claim that the first two classes above have status purely as causes must be qualified by recognizing that, in the first place, personality affects the probability of exposure to a given set of environmental conditions. But, as for the third class above, it is almost completely unintelligible to conceive of personality determining genetic constitution.

GENERAL ORGANIZATION OF MATERIAL IN THIS CHAPTER. Most of the influences discussed in this chapter are of the above type—more intelligible as causes than effects. For convenience in exposition these influences will be dealt with in three sections:

1. Relatively specific, alleged neurosis-producing or anxiety-producing conditions, clearly environmental in origin and acting over a relatively brief time span. Here we include such conditions as interview stress, therapy, parachute training, etc.
2. Life-condition influences, such as genetic determination, occupation, and age. Some of these are conceivable as effects almost as easily as causes, and all tend to be more within-the-organism than categories 1 and 3; yet, with the reservations noted above, they are here treated as causes.
3. More molar and longer-lasting conditions impinging on the organism. Here we approach the more global issues of neurosis and anxiety in relation to the total culture pattern, the cultural determination of personality (11), etc.

We have noted time and again that a proper taxonomy of situations and influences cannot develop until the dependent variables on which these act are specified comprehensively, meaningfully, and systematically by multivariate analysis. The needed response dimensions have only recently been defined adequately; hence, a large body of systematic condition-response data does not yet exist. Our short rations of factual data will compel us to subsist at times on manna from the higher realms of supposition, but we shall try strictly to signal where we shift from exact experimental data on defined concepts to facts about neurosis and anxiety which rest only on popular, vague, and shifting verbal designation.

Evidence on Briefer Environmental Situations Provocative of Anxiety and Neuroticism Changes

A few experiments can be assembled which use measures of definite factors, though they typically deal with briefer situations, natural or manipulated, than in most clinical situations. The available data are summarized in Table 11–1, which must be understood in terms of the background of experiment described below.

The following studies were involved: R3, described more fully elsewhere (65, 70, and Appendix I), where eighty-six college males were measured on the same sixty-nine response variables, on each of two occasions, four weeks apart. The environmental conditions 1–3, discussed in the following paragraph were manipulated systematically in an on-off manner between the two testing occasions. MR, described more fully elsewhere (p. 168 and Appendix I), and also referred to as the stimulus-controlled P-technique study. In MR, each of eight neurotic depressive patients were measured on thirty-four response variables on each of five occasions distributed over a three-day period. Interview stress (see 1. below) was manipulated in an on-off manner over these five occasions. Other less central studies are mentioned briefly below and described more fully in the references cited. First, a study under Sells (198) compared scores, on essential elements of U.I. 24 Anxiety, for military airmen immediately before and after their first light plane flight. Of the 249 cases tested, 61 per cent showed a decrease in anxiety between the pre– and post-flight testing, while 39 per cent increased. Secondly, Tsushima (216) measured a group of eighty-five students on the IPAT Anxiety Scale (43) which measures the Anxiety factor, F(Q)II, in the questionnaire medium (Chap. 4). Two weeks later these same students were measured again, immediately after examination results had been given out in class. In these results, the students were "failed" randomly. There was a significant increase on anxiety in those students who were told they failed, as contrasted with those who were told they passed. As part of an exploratory study by Hunt *et al.* (122)[1] at the University of Illinois Student Counseling Bureau, twenty-five students with emotional problems were measured on all sixteen questionnaire dimensions of the 16 P.F. (62), before and after therapy, permitting estimates of therapy-associated changes along second-order questionnaire dimensions. The data from Basowitz,

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[1] The reference cited deals mainly with the general design aspects of this study, also giving some of the data. The data cited here were contained in a personal communication to Dr. Scheier from Dr. Thomas Ewing, Associate Director, University of Illinois Student Counseling Bureau, May, 1958. The data were in terms of first-order questionnaire factors, the second-order estimates being made by the present authors according to the methods employed in Chap. 4 of this text, pages 45 f.

Grinker, *et al.* in Table 11–1, are part of an ambitious interdisciplinary study depending largely on physiological measurements of Anxiety (see 10, pp. 277 ff. and Chapter 10 here).

The environmental conditions applied, as listed in Table 11–1, are:

1. *Provocation of Threatening Ideas or Interview Stress:* This was the stirring up of unpleasant ideas about one's life situation; in R3, by a questionnaire which required the subject to answer questions covering common threats such as ill health, poverty, war, etc.; in MR, by a face-to-face stress interview, with freedom to probe further when sore spots were found.
2. *Anticipation of Treadmill Run.* Generally, this was interpreted as the challenge of a contemplated inevitable, physically unpleasant situation, specifically, running to exhaustion on a treadmill. In R3, the subjects were tested just after they had received a surprise notice to appear for this run within two days.
3. *The Imminence of Academic Examinations.* The college students in R3 were tested a few days prior to exam period, a comparison being made with the score when exams were over a month away.

   The other four conditions are sufficiently well described for our present purposes by the Table 11-1 titles and the text above.

A general conclusion warranted by the data of Table 11–1 is that "stress" conditions do not consistently have the effects one would expect from a priori analysis of only the stimulus situation itself. Specifically, there is no evidence that just because we prefer to think of a stimulus condition as one entity it has effects along only one response dimension. On the contrary, most of the stimulus conditions show positive evidence of having effects along at least two distinct personality response dimensions. For example, Imminence of Academic Examinations correlates significantly (.20 or above) with three or four independent response dimensions (Table 11–1). Thus, the effects of a "single" condition (stress or otherwise) tend to be complex in terms of personality response structures, just as the determination and expression of neurosis is complex (Chaps. 6 and 7). Alongside our multifactor theory of neurosis we now have a multifactor theory of stimulus condition (Stress) effects, and the latter casts grave doubts on attempts to assess stress effects by means of only one or a few dependent variable tests. Broad coverage of response dimensions is necessary to ensure discovery of possible response effects and to permit discovery of previously unsuspected relationships. For example, Table 11–1 reveals that the stress situations had significant effects along personality dimensions never previously considered in discussions of anxiety and stress hypotheses.

The wide response-dimension coverage described above also makes possible clearer distinctions among the various conditions in terms of their effects. For example, if only Inhibition (U.I. 17) had been used as a response dimension, the treadmill run and the exam stresses would have been hard to distinguish, since each significantly lowers Inhibition. But as other response dimensions are brought into the picture we see that, as often as not, these two conditions tend to have effects in different directions along a given response dimension. In general, the various kinds of stress situations studied are more alike than different in the factors they influence, but nevertheless are quite distinguishable from one another in the direction and degree of their response relationships.

As noted above, the "stressful" conditions (referring especially to the first three stimuli in Table 11–1) are more alike than different in their effects, and the general trend in these effects is something that would not have been expected simply by looking at the stimulus conditions employed, without checking on their actual response effects. As stimuli, these might look like stress, but in fact they tend to influence responses away from the neurotic or the high-Anxiety pole of response dimensions. Except for P.U.I. 4 and U.I. 35, where the type-defined relationship to neuroticism is slight or unknown, all factors in Table 11–1 are given at the pole known to associate with clinically judged presence of neuroticism (Chaps. 5 and 6). Therefore, the predominance of significant or near-significant *negative* signs in the first three rows of Table 11–1 means that application of the so-called stress situations actually tends to make (normal range) persons less neurotic in terms of the majority of independent neurotic-contributory dimensions. More specifically, the direction of influence by a challenge to face something tough in the immediate future is a reduction of neurotic condition. The exceptions to this general unexpectedness of trend are Pathemia, which does tend to be moved towards its neurotic pole by increased stress, and the Effort Stress dimension, which is affected as one would expect from our analysis of its nature as effort at control (Chap. 9).

Later we shall have more to say about the provocative possibilities of the above trend, in terms of "graded stress therapy," and also about the need to know whether a person is Pathemia-salient, Anxiety-salient, etc., or neurotic, before deciding which types of stresses to apply or remove.

Now that we have blocked in the general picture on briefer provocative situations, we can deal with some of the more interesting details. First we shall concentrate on the Anxiety dimension, thereby also including the previously neglected situations shown at the bottom of Table 11–1. Therapy decreases Anxiety (and decreases Introversion)

TABL

SUMMARY OF DATA ON RELATIONS BETWEEN BRIEF

Provocative Situations	*Anxiety and Neuroticism-Related Dimensi*		
	Anxiety F(Q)II, U.I. 24 and P.U.I. 9	*Effort Stress* P.U.I. 4	*Pathemia* F(Q)III+,U.I. 2 and P.U.I.
Provocation of Threatening Ideas†	.00(R3) .00(MR)	+.28(R3) +.45(MR)	+.02(R3) +.43(MR)
Anticipation of Treadmill Run	+.13(R3)	−.16(R3)	−.07(R3)
Imminence of Academic Examinations	−.25(R3)	+.16(R3)	+.20(R3)
Therapy-Counseling‡ (Hunt, *et al.*)	− (Hunt, *et al.*)	No Data	No Association Found
Believed Failure on Academic Examinations	+ (Tsushima)		
Anticipation of Dangerous or Challenging Flying Experience	+ (Sells)		
Removal of Parachute Training "Stress" (Several days after training)	+ (Basowitz)		

*All personality dimensions are given at their neurotic-contributory poles, except for Effort Stress and Long-Circuited Dynamics, where relation to neurosis has not been clearly established. The sign (+ or in any one cell of the table gives the direction of effect (association) that dimension, at the pole described in its column heading, due to th stimulus in the intersecting row. Thus, for the Treadmill Run-Neuro Debility cell, the −.35 value means that Anticipation of Treadmill Ru *lowers* Neurotic Debility. Actual correlational (factor analytic) value for the relationship are given, where available, while the appearance

while Anxiety increases with believed failure in exams and anticipation of dangerous flying experience (higher before the flight than after it). In all cases, this is as one would expect. But naive a priori expectations are upset by the findings that provocation of threatening ideas has no effects at all on Anxiety, imminence of exams lowers Anxiety, and

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tuations and Changes in Anxiety and Neuroticism *

Neurotic-Contributory Directions				
hibition .I. 17	*Subduedness* F(Q)IV–, U.I. 19–	*Neurotic Debility* U.I. 23–	*Rigid Superego* U.I. 28	*Long-Circuited Dynamics* U.I. 35
.06(R3)	+.03(R3)	+.06(R3) +.08(MR)	+.01(R3)	–.04(R3)
.20(R3)	–.24(R3)	–.35(R3)	+.06(R3)	–.12(R3)
.43(R3)	–.10(R3)	+.04(R3)	–.62(R3)	+.07(R3)
Data	No Association Found			

ign without a value indicates a t-ratio type comparison approaching
achieving significance. The study in which the data were found is
en in parentheses, and more fully described in the text and Appen-
I.

Provocation of Threatening Ideas" also tends to increase a dimension
tatively identified as Adrenergic Response, P.U.I. 5, in the MR study
e Chap. 10, pp. 210-13, for description of this dimension).

erapy also slightly reduces Introversion, F(Q)

parachute training having been finished for several days is associated with a rise in Anxiety relative to what it was during training. An hypothesis which would fit these at first puzzling data is that the Anxiety response pattern is one which appears most in situations removed in time (future or past) and about which nothing can be done immediately. Thus, it is seen that Anxiety is higher four weeks before exams than during them, higher after dangerous parachute training experiences than during them, and higher with belief that an exam has been failed and it is too late to do anything about it (216). The tendency to lowered Anxiety after a first airplane flight is at least not inconsistent with this hypothesis, for Sells' beginning trainees still had a number of flights to go in their training, that is, there was still something they could do about the situation. The corollary to the above hypothesis is relative serenity (low Anxiety) in situations where the person finds things he can do something about. This might be referred to as escape from vague anxieties into the situation, and attempts by highly anxious persons to do just this may explain clinical observations which have been made of excessive busyness accompanying Anxiety (153, p. 172).

Anxiety may also arise in a present situation about which the person declines to do anything, or about which, because of neurotic, rooted, characterological defects he feels incapable of doing anything. Thus, the sources of Anxiety typically seem to be largely internal and symbolic, as evidenced by its comparative lack of response to immediate external concrete threats or, at least, its reaction to them at irregular, remote time intervals and with magnitudes that seem more determined by internal cues from personal interpretation and the personality structure. Regardless of deferment from the present, the maximum reactions seem to be those not to threats to the physical self, but to the total self and its ergic satisfactions, such as blows to the total self-sentiment, especially if no defensive acivities for the future can be initiated.

The actual drop in Anxiety when what has long been thought to be a threat situation (in R3, a pending examination) actualizes itself, has often been noted by perspicacious literary observers. There are numerous stories of restless, anxious characters who achieve serenity when they get into really dangerous situations (about which they can do something), externalizing their anxiety, to use a literary phrase. This observation is well expressed by a line from Julian Grenfell's war poem "Into Battle:" "And when the burning moment breaks/and all things else are out of mind." In our terms, it can be expressed as the substitution of the Effort Stress response for Anxiety.

By contrast, with Anxiety (P.U.I. 9), Effort Stress actually rises significantly or almost significantly in the examination situation, and in both studies where there was provocation of threatening ideas (see Table 11–1). Some psychologists might like to call this immediate response to stress "anxiety," and, not to carp, it is *possible* to call P.U.I. 9 and P.U.I. 4, Anxiety I and Anxiety II. But Effort Stress seems to us a more appropriate title for P.U.I. 4, since neither trait or type definition placed this factor as anxiety (See Chaps. 9, 5, and 6). Effort

Stress (P.U.I. 4) typically lacks the subject's own questionnaire-measured awareness of anxiety and also lacks any empirical relation to psychiatrically evaluated anxiety level, while the Anxiety factor has both of these. However, a critic could argue that if the conscious awareness loadings were the only ones differing, this difference could be regarded as nothing more than an artifact, due to the subject getting used to more permanent anxiety and failing to report it as its true level in a temporary state. (If someone were "born anxious" would he know that he is more anxious than average?) This criticism we reject, for the Anxiety and Effort Stress factors differ also in their loadings on objective tests, which depend much less on the subject's conscious awareness.

To sum up, Effort Stress is regarded as a short-term response to environmental stress which differs from the standard Anxiety pattern both in what provokes it and, usually, also in the responses which associate with it. It is apparently characteristic of effort, anger, and even intense cognitive concentration. Indeed, the only common denominator to all provocations of P.U.I. 4 seems to be effort—effort at concentration, effort at control of anger, fear, or any other emotion including Anxiety (see discussion MR study pp. 170–71). Even physical effort could produce Effort Stress, although this probably has more potent effects elsewhere.

Turning now to other neurotic state factors, we may note in more detail the data of Table 11–1 which gave rise to our previous generalization that almost all the significant correlations are negative between neurotic phase and environmental demand. Anticipation of the treadmill run reduces Neurotic Debility (U.I. 23—), Subduedness (U.I. 19—) and Inhibition (U.I. 17). Actual involvement in the examination stress tends to reduce all the neurotic phase factor-values (loadings from —.10 to —.62), except Pathemia, which it increases (+.20). In the neurotic-state factors which we have called dynamic, notably, Rigid Superego, Neurotic Debility, Subduedness and Inhibition, the general effect of stress situations is to reduce the neurotic score (see negative signs in Table 11–1). One is reminded of a remark attributed to Dr. Johnson in his usual realistic vein, "Believe me, Sir, if a man knows he is to be hanged tomorrow, it clears his thoughts marvellously." Somewhat less dramatically, the man in the street might say that environmental demand "forces the neurotic out of himself." Indeed, there is some evidence that during World War II bombings of London, the incidence of suicides and psychoses in that city actually dropped (210), that "nervous" disorders among normals increased only slightly and then only under the most intensive bombings (210), and finally, that hospitalized neurotics were at least not made appreciably more apprehensive by the bombings (167).

It would be absurd to make any simple inference from this, such as, that shock therapy should be good for neurosis, since the factors and stimuli concerned are so very different in their nature and causes. Yet, it is well worth following up the indication here that some components in the neurotic character might be helped towards normality by a carefully graded series of exposures to emergency situations, each tested to ensure that it produces shift in a non-neurotic direction instead of the collapse one might reasonably anticipate from a truly excessive demand (see also discussion, p. 423). If the theoretical appreciation in the next section and in the next chapter is correct about the nature of Rigid Superego, this factor is rooted too far back in infancy to be changed permanently without lengthy systematic re-education, and undoing of repressions; but conceivably, at least unduly high levels of Inhibition Anxiety, Resignation, and Neurotic Debility could be shifted toward normal levels by a program of re-education by emergency environmental demands in which the individual responds successfully to a graded series of stress situations. This is not Skinner's therapy according to rules of simple conditioning (205) nor is it Psychodrama (159), but it may contain an important element of truth common to both of them; namely, reward for integrative behavior in challenging situations.

Of all the neurotic-related factors, only Pathemia tends to behave as expected to environmental demand. Provocation of threatening ideas and examination imminence both push it toward its neurotic-related Pathemia pole. (Pathemia, it will be remembered, had the highest association of any factor with clinically judged neuroticism, as discussed in Chap. 5.) This reaction seems to represent a retreat from epicritic cortical to pathemic feeling activity and could be due to having mental energy, at least in the case of examination imminence, tied up in detailed means-end knowledge or, otherwise, to the effects of fatigue and frustration from the days or (if students are to be believed) weeks of hard study preceding examinations.

More research is needed to follow up the promising leads discussed above. The program should investigate a wider range of stimulus types and intensities as they act over a wider range of types of people.

Life-Condition Influences, Including Genetic Determination, Age, and Occupation

As noted previously, this category involves more permanent influences, stemming more from within-the-organism, as basic conditions of existence.

INTERPRETATION OF NATURE-NURTURE DATA ON THE ORIGIN OF PERSONALITY FACTORS. Research in this area is necessarily large-scale and our studies on over five hundred children in various genetic and environmental relations by the Multiple Abstract Variance Analysis design (36, 52, 72) proved to be based on a not completely sufficient sample. Nevertheless, at this point it is valuable to have preliminary knowledge of those neurotic dimensions which are extensively modifiable and those which are largely constitutional. We are operating here under the strategic principle that the first research task after establishing personality factors is to find, by nature-nurture investigations, broadly in which area their origin lies. Presumably, as the development and operation of a personality structure is more highly determined hereditarily, there is less that an environmental manipulator (therapist or experimenter) can do to change it, even though some genetically determined traits do fluctuate over time (Chap. 9, p. 159). The relevant studies (36, 52, 72, 89) indicate that (a) Intelligence and Comention (U.I. 1 and 20) are almost wholly determined constitutionally; (b) Inhibition, Resignation, Exuberance, and Neurotic Debility (U.I. 17, 19, 21, 23) have appreciable constitutional determination; while (c) Harric Assertiveness, Pathemia, Rigid Superego, and presumably, Responsive Will (U.I. 16, 22, 28, 29) are almost wholly environmental. Unfortunately, no data exist for Anxiety in objective tests (U.I. 24), but the main first-order factors in questionnaire-measured Anxiety (Chap. 4) have the variance relations shown in Table 11–2, middle section. There we see that, except for the Timidity or Threctia (H—) component, Anxiety level tends to be more environmentally than hereditarily determined, and (lower part, Table 11–2) somewhat more tied up with accidents of individual environment than with differences of environmental atmosphere between families.

It checks with the above data that Intelligence and Comention are not found in states which respond to relatively momentary stimuli (see Chap. 9 and Table 11–1) while most of the others have enough environmental sensitivity to be so affected. The order above, from almost complete genetic determination to almost complete environmental determination, can be understood as corresponding to an increasing potential scope for control of personality development and structure by manipulation of the environment.

Additional to the above information on the nature-nurture ratio in the total environment for objective test factors, we have some information on the source of the environmental components, in terms of relative contributions of within-family and between-family environmental differences. Among the largely environmentally determined neuroticism-related factors, on which we shall concentrate here, the ratios of between-family to within-family environmental differences decrease in the order shown in Table 11–2, top section.

TABLE 11-2

Role of Environmental Segments in Determining Total Variance in Largely Environmentally Determined Neuroticism-Contributory Personality Factors

	I. Neuroticism-Contributory Objective Test Factors (Environmentally Determined)	
As to Source of Environmental Contribution	U.I. 16 (Assertiveness)	Three to one for between-to within-family
	U.I. 22 (Pathemia)	Two to one for between-to within-family
	U.I. 28 (Rigid Superego)	Three to two for between-to within-family
	U.I. 29 (Responsive Will)	One to one for between-to within-family
	U.I. 23 (Neurotic Debility)	One to two for between-to within-family
	II. Anxiety and Neuroticism-Contributory Questionnaire Factors: Ego Strength (C), Guilt Proneness (O), Self-Sentiment (Q_3), Ergic Tension (Q_4), and Threctia (H)	
As to Nature-Nurture in Total Environment	C, O and Q_3	Two to one ratio of environmental to hereditary variance determination
	Q_4	One to one ratio of environmental to hereditary variance determination
	H	Largely hereditary determination, except for some within-family environment variance
As to Source of Environmental Contribution	C and O	Variance largely within-families
	Q_3 and Q_4	Variance about equal between-and within-families

With these clear indications of the importance of environment in certain neuroticism factors, and a preliminary indication of whether to look to differences of family atmospheres (between-family variance larger) or individual differences of history and status within the family (within-family variance larger), it becomes profitable to develop more specific hypotheses concerning the manner in which neurotic-related personality structures develop.

We are compelled here to work on hypotheses, and on fragmentary evidence, but we are prepared, on much indirect and not easily summarized inference from the actual test performances in Rigid Superego (U.I. 28+), to designate it as the factor most concerned with infantile experiences. It does not represent so much a single Freudian conflict (for example, over the Oedipus adjustment or anal-erotic, toilet-training experiences) as a precipitate in the personality of general libidinal conflict at this period. It shows excessive dependence upon, together with hostility toward, authority; some association with parental discord (observed clinical cases); asthenia and general lack of drive, together with compulsiveness, insecurity, and resentment, and general signs of weak ego development. Qualitatively, one suspects this behavior ties up with a dimension of family behavior located by Baldwin (7, 8) and defined as Factor 5 in Cattell's integration of family dimension studies (33, p. 373). This factor involves "acceptance, affection, emotional rapport, practical shrewdness *vs.* distance, rejection, 'autism in the group.' " Baldwin found emotional, non-conforming behavior in children from such homes, and poorer originality and independence (as in U.I. 28+). As our nature-nurture analyses show, the development does not depend wholly on family atmospheres, but arises almost equally from purely individual history within the family, and this we suspect lies in events around two and three years of age. In fact, our hypothesis can be formulated to the highest exactness possible at this point by the statement that Rigid Superego arises from conflict at about the 2– to 5-year-old level, concerned with the toilet-training type of problem, and basically with defective parental attachment relative to severity of discipline, and with difficulties in proceeding from an incomplete Oedipus attachment to an introjection of parental standards. The result, in general psychoanalytic terms, is some tendency to instinctual regression and a defective ego and, theoretically (though descriptively this is not evident), superego development. Severity, lack of affection or discord between parents could alike contribute to it.

It is consistent with this early-age formation hypothesis that Rigid Superego (U.I. 28+) shows little change over the nine to fifteen year period (see Diagram 14–1, p. 617 in 44). Presumably, once formed, it remains a relatively fixed aspect of personality structure, short of deep therapy, predisposing the individual to maladjustment with all sorts of life situations. Up to this point, U.I. 28 has been called on a descriptive basis Rigid Superego, Asthenia, or, in more dramatic terms, the "Hamlet factor"; but at a more interpretive level, it could also be described as Ego Weakness from Infantile Trauma.

The determination of the neurotic personality in terms of Protected Emotional Sensitivity, or Premsia, and Pathemia (U.I. 16−, 22−), is likely to be the effect of a family atmosphere acting in a general way upon the education (or miseducation) of adjustment habits over a prolonged period, since the inter-family environmental variance is so large relative to within-family variance (Table 11–2). We have already had reason to identify Premsia with an overprotective and over-indulgent family atmosphere, and Harria (U.I. 16+) with its converse, a bracing realistic training with substantial demands for responsibility and opportunities to exercise it (Chap. 5, pp. 68 f.). The strong association of U.I. 16+ with freedom from neurosis (Chap. 5) suggests that low Premsia (or Harria) is the result of realistic training and early exercise of responsibility, presumably showing in greater growth of self-assertion and the self-sentiment, whereas a different type of family environment will produce high Premsia, which shows itself in defective self-confidence with marked development of emotional sensitivity and probably inner phantasy.

The influences governing the development of Pathemia (U.I. 22−) are relatively obscure, but the high ratio of inter– to intra–family determination (Table 11–2) again suggests a family-wide educative atmosphere, differing more between families than within any given family. Corticalertia (opposite pole to Pathemia) has been defined as the handling of problems at a high level of cognitive "dryness" as distinct from the Pathemia of reacting with emotional, cognitively unfocussed and, therefore, often prejudiced, inapt reactions. We hypothesize that the influence governing the development of Corticalertia *vs.* Pathemia is possibly no more than what we call education itself, in the sense of a higher degree of self-critical, rational, trained habits of thought—and that individuals growing up in a conducive atmosphere acquire over a sufficient period the typical poise and rationality. In Pathemia through a poor education, we have an instance showing that early neglect as well as early overprotection (as in Premsia) can lead to later maladjustment.

We know that Corticalertia rapidly increases through the growing years (44, p. 617) but some individuals in some families are carried further than others toward this cognitive competency and severity in handling problems. This habitual control by reason, enabling the individual to transcend blind emotionality of response is presumably at all life stages a prophylactic against neuroticism, accounting for the very high relation we find between Corticalertia and freedom from neurosis (see Table 5–1, and p. 71).

The remaining highly environmentally determined factors are Neurotic Debility and Low Adaptation Energy (U.I. 23—, 29—). A cooperative resemblance has already been noted between the behavior content of these two factors, the difference being roughly expressed by saying that Neurotic Debility is an incapacity to mobilize, with emphasis on internal as much as external coordination and on broad performances, covering conscious and unconscious resources, such as low fluency, ataxia, poor two-hand coordination, etc. Low Adaptation Energy on the other hand, is an incapacity to mobilize and direct, as by the will, a consciously controlled performance in response to an immediate onslaught of external demands, as in the cursive miniature situation test, speeded letter comparison, etc.

These two factors have up to a quarter of their variance constitutionally affected, while the environmental contribution comes relatively more from individual than from family-wide differences in environment. Therefore, the determination of these neurotic process factors is likely to be less affected by systematic (family-wide) miseducation than are the above discussed Pathemia, Rigid Superego, and Premsia.

Two hypotheses that fit this picture are (a) effects from physical illnesses (for example, those resulting in glandular or brain injury) and (b) varying exposures to trauma that could occur to anyone regardless of his initial dynamic make-up. In regard to the latter, the sibling position might be involved, except that this has rarely been found to have any significant relation to neurosis. It is more likely, therefore, that we are dealing with effects of prolonged exposure to conflict situations that are relatively accidental, such as the death of a parent in one's infancy, a sexual seduction, an occupational misfitting, a wartime separation from one's family, and other "stresses," quite as likely to be operative in adult life as in childhood.

As to the physiological and other concomitant character of the above influences (cause or effect), we hypothesize that both factors are in some sense fatigue-exhaustion conditions, but not simply the Diurnal Fatigue factor. This notion has already been developed with respect to U.I. 23—, as neural exhaustion or debility (44, pp. 251 ff.) with evidence that it follows from defective sleep, prolonged conflict, etc. We are inclined to proceed further and associate it with adrenal exhaustion, on such evidence as the association with diminished metabolic rate change with stimulation. Low Adaptation Energy may also be connected with some hormonal exhaustion, as of ACTH, but it shows itself more in defect of will and a general lack of responsive vigor when response is intended, together with a low basal metabolic rate and a low tempo. Here the fatigue suggests an inhibition of the C.N.S. rather than an hormonal condition which could come from discouragement through repeated failure. Alternatively, it deserves investigation as a defect of thyroid action, possibly relatable to prolonged discouragement and perceived failure of the self. Any of the above hypotheses would place Neurotic Debility and Low Adaptation Energy as late supervening conditions in the neurotic process rather than earlier incompetences (as causes) which bring on frustrating situations, for the latter explanation of their appearance in neurosis would seem to require them to be more constitutional than they actually are. However, a tailspin of incompetence-discouragement-incompetence could also occur.

Age trends in neurotic-contributory and anxiety factors. Age trends in neurotic-contributory factors are a complex resultant of genetic and environmental influences, particularly difficulties in meeting demands for cultural and educational accommodation. Like the nature-nurture data in the preceding section, age trend data will indirectly help locate and identify such influences, although it will not permit us completely to unravel the interrelationships.

As for objective test evidence, the recent Objective-Analytic batteries (73) have not yet been widely and systematically applied in research, and even when data exist they are usually over too brief an age range to provide extensive life-course data and are on too few cases to permit any confident final assessment of statistical significance. Accordingly, we shall regard the objective test age-trend data only as indications needing further confirmatory research. Cross-sectional data exist for some five hundred children over a 9– to 15-year-old age range, and the curves have been set out elsewhere (44, p. 617). In summary of available neurotic-contributory factor data over this period it is noted: (a) that Comention (U.I. 20+) or Conformity to Cultural Standards, rises steeply; (b) that Rigid Superego (U.I. 28+) begins to drop slightly, consistent with our supposition that it represents regression and asthenia from early mental conflict; (c) that Inhibition (U.I. 17+) rises steadily; (d) that Pathemia (U.I. 22−), the emotional failure to handle problems at a cortical, "epicritic" level decreases rapidly over this period (in terms of population standard deviation units), indicating some general educational process carrying the typical individual out of the emotional childishness of early childhood; (e) that Exuberance (U.I. 21+) drops throughout middle childhood, in a curve suggestive of a maturation process, though it could also be the systematic taking-on of the burden of long-circuiting in our culture; (f) that Neurotic Debility (U.I. 23−) drops during this childhood period but parallels intelligence in a tendency to flatten out around fifteen years of age; (g) that Premsia (U.I. 16—) remains at virtually the same level, or perhaps decreases very slightly. Total objective test score, roughly averaged over neuroticism-contributory factors, shows a slight trend toward reduction of total neurosis over this 9- to 15-year-old age range. But though this average may be interesting as a criterion prediction, it is a mixture of very different factors, each distinguishable from the others in the age trend it shows. And in so far as these neurotic-contributory factors do not behave as a single flock, information is bound to be omitted in any statements about age trends for neuroticism in general. At some point, each neurotic-contributory factor must be measured, then considered and treated separately. However, some general trends can be perceived, notably, an increase with age of controlling, binding, and inhibiting factors, both those which do and those which do not contribute to neurosis. At the same time there is some decline in the severity of early conflicts (U.I. 28+), an increase in capacity to mobilize (U.I. 23+), but a decline in natural reserves of energy to repair conflict (U.I. 21—).

In the field of questionnaire data, a somewhat better supply of information exists as summarized in Table 11–3 and Diagram 11–1. There, age trends are estimated cross-sectionally—each age represented by different people—for normals and for neurotics, on all four of the

DIAGRAM 11–1

Rough Diagrammatic Presentation of Age Trends in Table 11–3, Normals Only

(Includes Also Some Objective Test Evidence from 9- to 15-Year-Old Range)

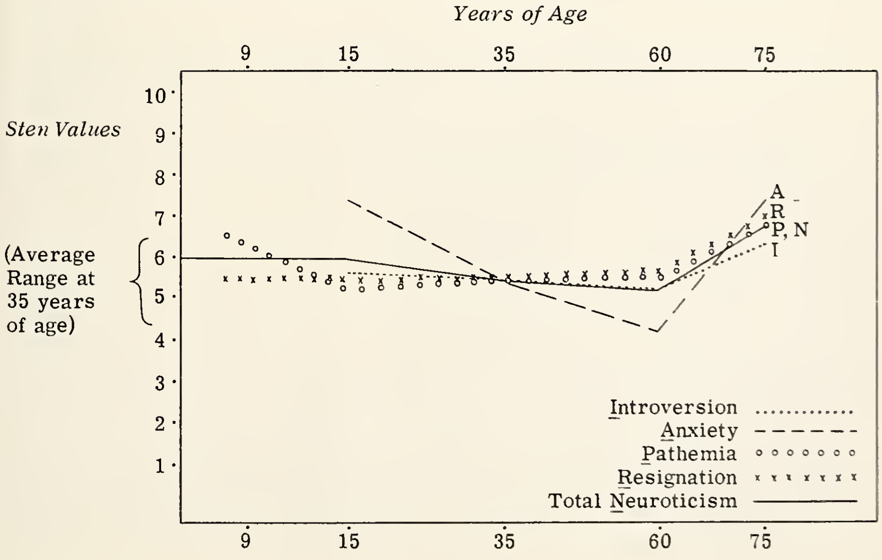

TABLE 11–3

AGE TRENDS IN NEUROTICISM, ANXIETY, INTROVERSION, PATHEMIA, AND RESIGNATION *

Questionnaire Measurements (at neurotic-associated pole)	Sten Values for *Normals*				Sten Values for *Neurotics*		
	at age 15	at age 35	at age 60	above 60, Av. = 75	at age 15	at age 35	at age 60
F(Q)I+, Introversion (Invia)	5.7	5.5	5.4	6.3	6.4	6.4	6.5
F(Q)II+, Free Anxiety	7.4	5.5	4.4	7.4	6.6	6.8	7.0
F(Q)III+, Pathemia (Emotional Immaturity)	5.1	5.5	5.6	6.9	5.7	5.7	5.6
F(Q)IV−, Resignation or Subduedness	5.4	5.5	5.7	7.0	5.8	6.1	6.4
Total Neuroticism (Composite of four factors above)	5.9	5.5	5.3	6.9	6.1	6.3	6.4

*The data are cross-sectional, sampling concurrently persons at different age levels ranging continuously from 9 to over 60 years of age. For normals, all trends were projected from 35 years as the average age (fixed at 5.5 stens, as the general population average), to the 15- and 60-year-old age points. The "above 60" values were computed directly from an N of 41 geriatric patients (see text), in terms of norms for 35-year-old persons. Values for neurotics were computed similarly as to projected trend, on the basis of norms for 35-year-old normals.

There were an almost exactly equal number of males and females in the total sample. For other background information, see text.

second-order questionnaire factors. Each factor is given so that its neurotic-associated pole is positive (high score). These data are among the first to be based on standard, meaningful test instruments, but they cannot be considered as anything more than rough general indications, provocative of hypothesis and further research, because of the following difficulties. First, the total sample was quite large, approximately five hundred, but still too small when spread out cross-sectionally over a span of forty-five to sixty years. One ought to have a large sample within each two or three year age range, in order to determine relatively short-term reversals or fluctuations in trend. Lacking the necessary sample size for this (at least five thousand cases, in our opinion), we must be content to indicate only gross straight-line trends over broad age ranges. Second, the total neuroticism score in Table 11–3 is restricted to questionnaire-measurable aspects of neuroticism which means only four of the some ten known neurotic-contributory factors (Chap. 6). Third, the Table 11–3 data were integrated from three sources, each using somewhat different methods of analyzing data. These were all convertible to the sten score system used throughout this book and to the time points of Table 11–3, with a precision which was fully adequate for our present exploratory purposes, but not perfect (see Table 11–3 footnote). The data on neurotics were computed directly from 111 cases for which age data were available in the R9-Q study (Appendix I). The age trends for normals from fifteen to sixty were based on several hundred cases, the number varying slightly from factor to factor (44, p. 615; and 62, Table 17, tabular supplement, p. 22). The evidence on persons over sixty years of age was provided through the courtesy of Dr. Eugene Byrd, Research Director, Division of Gerontology, University of Miami (Fla.) Medical School. These forty-one cases were actually geriatric patients, retired and dependent on social security, and there is some doubt as to the category (normal, neurotic, or other) in which they fit best. They were placed in the normal category here because at this advanced age (average: 75–76 years), a high proportion of people, who would have been considered normal when younger, need some sort of special geriatric care.

The Table 11–3 age trend data suggest that for neurotics, neurosis level changes very little throughout the fifteen to sixty year age span, with perhaps a slight increase in total questionnaire-measured neuroticism, particularly in its Anxiety and its Resignation aspects. There is something ominous in this—for almost all these 111 neurotics were undergoing therapy at the time of testing and one could argue that therapy or whatever other balm life offers is not enough to alleviate the neurotic's complaints as he matures chronologically. However, this conclusion could hold for therapy only in so far as it could be shown for the neurotics tested that treatment had occurred throughout previous years, and not just recently.

At all ages up to sixty, neurotics tend to be higher than normals on total neuroticism level and on each of the four neurotic-contributory factors. The exceptions to this expected trend are: (a) Pathemia, which is at about the same level in neurotics and normals, from age thirty-five on, and (b) free Anxiety which, at fifteen years of age is higher for normals than for neurotics. The Pathemia finding is puzzling in that questionnaire and objective test data on neurotic and normal groups representing the entire adult age range (Chap. 6) showed neurotics to be much more markedly Pathemic than they appear to be here. Evidently, the 111 cases from the R9-Q study, used in Table 11–3 because age information was available for them, happened to be appreciably less Pathemic than the other ninety cases in the R9-Q sample, for reasons which presently are not understood. The Anxiety finding could be explained by assuming that, while free Anxiety is high both in normals and neurotics during adolescent troubles, the neurotics are beginning to bind it or have already bound it in neurotic structures.

Neurotics (by type), as noted before, tend to remain just as neurotic or even to get more neurotic with increasing age, while the trend in normals is for a slight decrease in neuroticism up to about age sixty, with a sharp rise toward neuroticism thereafter. This latter trend has in a general way been confirmed by the earlier work of Hamilton (109), Shock (203), and Willoughby (224, 225), whose evidence, as cited by Zubek and Solberg (236), indicates a constant neuroticism incidence and/or prevalence in the general population from about age twenty to age sixty, with a sharp increase thereafter.

Let us now consider age trends in each neurotic-contributory dimension, as they appear for *normals* (Table 11–3, Diagram 11–1). (i) Introversion shows little systematic trend from 15–60 years, but rises after 60. (ii) Pathemia decreases sharply from 9–15 years (objective test evidence, p. 258), then levels off (perhaps because early education has now formed its relatively permanent personality effects, see p. 256) until beyond age 60, where it increases quite sharply (discouragement, frustration, see pp. 169 f.; or even second childhood). (iii) Resignation is virtually unchanged from 9 to 60 years but increases perhaps slightly in middle age and, as we would expect from our knowledge of the factor, increases sharply in old age (objective test evidence, 44, p. 617 and Table 11–3). (iv) Our evidence suggests that overall neuroticism level declines slightly throughout life for non-institutionalized persons until around age sixty, when it begins to rise steeply (objective test evidence, p. 259, and Table 11–3). (v) In the normal person, free Anxiety is very high in adolescence, drops sharply as adulthood is reached and continues to drop steadily throughout middle age until it rises steeply again, in very old age.[2] By contrast, Anxiety in the neurotic tends to rise slightly with increasing age.

These findings of high Anxiety in adolescence provide quantitative evidence of what would be expected from G. Stanley Hall's theory of adolescence (108) or from Goethe's intuitive description of "Sturm und Drang," half a century, and, even more, after they were conceived. The coincidence of three main adjustment problems: to socio-culture values, to the opposite sex, and to adult occupational status, raise simultaneously the level of frustration and the demands for control and, therefore, the level of the generated anxiety. (The Anxiety rise in late maturity perhaps lies more in the external threats of loss of status, disease and death.) The fact that very high adolescent levels of anxiety are normally followed by an adult return to average levels suggests that Anxiety per se is not necessarily pathological.

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[2] In each of two studies with college students, not previously cited here, chronological age was entered as a variable and proved to have a non-significant and virtually zero correlation with the questionnaire Anxiety Factor, F(Q)II. This indicates that Anxiety is, on the average, at a relatively constant level during the college years, though tending to decrease slightly during the middle years of adulthood (see text above). The two studies were by Bendig (17), with 238 American undergraduates and by Warburton (See Warburton, Appendix I) with 112 British graduate students.

Relations to education, occupation, and other social situational influences. Learning and education belong in any discussion of situational influences, since they are crucial in determining what ultimate use the organism makes of his environment. Obviously, what the organism learns to see in and do with his environment may be quite different from what the environment really is in its raw form, or what it presses toward.

As far as learning in the sense of classical reflexological conditioning is concerned, our results (Chap. 5) have already indicated that Anxiety is not highly involved and less so than other dimensions. As for learning defined in terms of school grades—which means level of accomplishment at a given time, the rate of progress being an inference —we have the following evidence.

The factor specification equation, based on the convergence of all evidence to date (62, 170, 234), for the prediction of grade school and high school performance from questionnaire factor endowment (62, p. 38) reads as follows:

$$\begin{aligned} Ps = {} & \underbrace{\overbrace{-.4Q_4 + .3C - .2O + .2Q_3 - .2L}^{\text{Anxiety Components}} - .2E - .2F + .5B}_{\text{Neurotic-Contributories}} \\ & - .4A - .3M - .2H \end{aligned}$$

Here Ps is good school grades, averaged over basic subjects; and the alphabetic letters designate questionnaire factors related to good school grades as indicated by their signs. Thus, good school performance is contributed to (or at least associated with) less Ergic Tension (Q_4-), more Ego Strength ($C+$), less Guilt Proneness ($O-$), etc. The bracketing in the equation illustrates how every one of the main Anxiety-component factors (Chap. 4) contributes to good grades, in their low Anxiety direction. That is, low Anxiety is associated with good grades, high Anxiety with poor grades. Questionnaire-measured neuroticism also associates negatively with grades that is, better grades with less neuroticism. Six of the eight neurotic-contributories in the equation are in the freedom-from-neurosis direction (Chap. 4); but factors E and F are in the negative, neurosis direction, and an important neurotic-contributory factor, Premsia or $I+$, is not associated at all. In fact, on present evidence, most of neuroticism's negative involvement in school grades comes from its Anxiety aspects. It should also be noted that factors not centrally involved in neurosis or Anxiety occur in the equation, that is, affect school performance and, further, that objective-test evidence is entirely missing, except as noted in this chapter's footnote 3. In general, the negative relation between scholastic performance and Anxiety or neurosis is far from perfect or one-to-one.

A second bit of evidence is the questionnaire-measured Anxiety and neuroticism levels for 1,128 college undergraduates (62, p. 28). As compared with the general population, these educationally more fortunate and successful persons have slightly lower levels both on Anxiety and on neuroticism (see Table 11–4 for approximate values). This trend can even be extended to graduate students in view of Bendig and Hountras' evidence (18) that graduate students (in education) are not significantly different from undergraduates in their U.I. 24 Anxiety level.

The best indication of rough average trend, therefore, seems to be that low Anxiety and low neuroticism are associated with scholastic success (implying an educational receptivity, learning ability, etc.) from grade school through college. It must be emphasized, however, that this is only a rough, averaged trend which probably reverses under a number of specific circumstances involving motivational level, difficulty level of material, age, intensity of Anxiety, etc.[3] As for the latter, a moderate amount of Anxiety probably facilitates learning, while a very high level almost certainly interferes with it. This means a curvilinear relationship (positive over the lower range of Anxiety intensity, negative over the upper). In general, there must be a very complex relationship between scholastic success and Anxiety or neuroticism, but any generalization that anxiety and learning are positively related, as sometimes claimed, is certainly not warranted by our present data. If anything, the overall, gross trend is quite the reverse in the typical school situation over normal ranges of Anxiety or neuroticism.

Another caution to be observed in interpreting these data stems from the possibility that Anxiety (or neuroticism) may be the effect as well as the cause of scholastic performance; that is, low school grades can produce Anxiety. In fact, the Tsushima (216) study discussed earlier in the chapter (p. 245) directly supports this possibility, for there the impact of believed failure in an examination raised Anxiety level. Presumably, academic failure leads to the self-deprecation and

[3] This may be one way of accounting for a slight reversal of trend in three studies (22, 59, 192, and Table 5–4) where objective test-measured Anxiety was slightly positively associated with good grades. Two of these earlier studies (22, 59) had not yet achieved good measurement of U.I. 24 Anxiety and dealt with younger children. About 75 per cent of the subjects in the third study (192) were freshmen, and therefore more likely to be "eager beavers."

sense of unworthiness we have found so prominent in the Anxiety factor (Chap. 5). One thinks immediately here of Smith's excellent work (see 206 and SM, Appendix I) showing a strong positive relationship between high Anxiety (U.I. 24+) and large discrepancy between "Self" and "Ideal Self." Specifically, Smith found that high anxiety associates with a greater "disparity between what an individual says he actually is and what he says he would like to be." The correlations between amount of discrepancy and the anxiety component factors are O, +.60; C, −.55; Q_4, +.48; Q_3, −.42; and L, +.19.

As we turn now to occupations, the circularity of cause-effect sequences continues to apply. Certainly, the personality make-up acts to determine the choice of, or selection for, an occuption, but the personality is also affected strongly by the circumstances surrounding occupational type and status. Obviously, occupation considered as a situational influence must powerfully affect personality because of the sheer proportion of waking hours during which it operates and its vital connections with success and self-esteem. Nevertheless, both cause and effect interpretations of occupation must be kept in mind, as investigators pursue leads in the data presented below. These are often difficult to separate in discussion, but it should be remembered that occupation as cause—in terms of the situational influences associated with it—is most germane to our present purposes.

Extremely high levels of neuroticism and Anxiety undoubtedly interfere with occupational success and adjustment. The case histories of neurotics almost invariably show a work history studded with dismissals, unemployment, and job-switching. Moreover, an analysis of Eysenck's data (85, 86) shows history of unemployment and unstable employment significantly loading the major neuroticism factors.

Here, we shall concentrate first on the relation between success in an occupation and anxiety or neuroticism within the normal range. On evidence so far available—again, unfortunately, not extensive and only from questionnaires—the trend is for the Anxiety or neuroticism level (within a normal range) to be either unrelated or negatively related to success in a given occupation (specification equations (62, pp. 38 ff)). Specifically, first, there is no overall relation to success in teaching, clinical psychology (diagnosis or therapy), or scientific research. Second, successful state patrolmen and successful salesmen (retail or wholesale) are slightly less Anxious than unsuccessful ones, but there is little difference in neuroticism level. Third, men who pass the United States Navy's rigorous Underwater Demolition Team (or U.D.T.) course have lower neuroticism levels than those who fail, but there is little difference on Anxiety (Table 11–4).

Table 11–4 compares a sampling of occupations on both Anxiety

TABL

NEUROTICISM AND ANXIETY LEVELS

(In Order of Hig

NEUROTICISM
(From Neuroticism-Contributory *Q* Factors)

Sten Deviation from Mean Value	Number in Group	Occupation
+1.6	12	Clerks, Higher Grade, Male (Bank, Insurance)
+1.4	21	Housewives
+1.4	46	Editorial Workers (Publishing House Office)
+1.4	19	Waitresses
+1.3	45	U.S. Navy Underwater Demolition Team Personnel (Failures)†
+1.1	22	Janitors
+ .7	13	Secretaries
+ .5	101	Nurses (Female)†
+ .4	34	Cooks, Kitchen Help (Female)
+ .4	141	U.S. Navy Underwater Demolition Team Personnel (Successful)
+ .4	15	Hairdressers, Barbers (Male)
+ .4	75	Psychiatric Technicians
+ .3	63	Executives (Business, Managerial)
+ .2	59	Teachers (Elementary Grade School, Junior High)
+ .2	14	House Painters
0	30	Clerks, Female (Filing, Typing, etc.)
− .2	14	Policemen
− .2	45	Convicts
− .3	40	Priests
− .4	16	Electricians
− .4	144	Researchers (Physics, Biology, Psychology)
− .4	1,128	College Students (Undergraduates)
− .5	13	Mechanics, Garage
− .5	20	Time Study Engineers ("Efficiency Experts")
− .5	145	Aircraft Engineering Apprentices (No College Degrees)
− .7	16	Firemen (City Fire Engines)
− .7	245	Airmen (Pilot Cadets in Training, U.S.A.F.)
− .7	20	Engineers (Mechanical)
− .8	41	Olympic Athletes
−1.5	35	Salesmen

*See text below for description of source and organization of these data.

†For very recent contributions of data, we are indebted to Lt. Col. James Tuma, USMC

and neuroticism average scores, each occupational group now including the relatively unsuccessful as well as the relatively successful in that occupation. The data were collated from several different sources (57, 62, 82) and converted to the standard sten system, where this had not already been done. The middle or zero-deviation row in Table 11–4 represents essentially the average value through the occupations sampled, and this is approximately but not exactly equal to the general

-4

:CUPATIONAL AND OTHER STATUS GROUPS *

Low Levels)

ANXIETY
F(Q)II

Occupation	Number in Group	Sten Deviation from Mean Value
:ditorial Workers (Publishing House Office)	46	+1.6
cience Fiction Writers	58	+1.3
.S. Navy Underwater Demolition Team Personnel (Successful)	141	+1.3
.S. Navy Underwater Demolition Team Personnel (Failures)	45	+1.2
.irmen (Pilot Cadets in Training, U.S.A.F.)	245	+ .7
.rtists	64	+ .6
;eneral Writers	31	+ .4
:xecutives (Business, Managerial)	63	+ .3
'eachers (Elementary Grade School, Junior High)	59	+ .3
lurses (Female)	101	+ .2
'riests	40	0
)lympic Athletes	41	− .1
:ooks, Kitchen Help (Female)	34	− .2
:ollege Students (Undergraduates)	1,128	− .3
'sychiatric Technicians	75	− .3
:esearchers (Physics, Biology, Psychology)	144	− .4
:lerks, Female (Filing, Typing, etc.)	30	− .4
.ircraft Engineering Apprentices (No College Degrees)	145	− .6
:onvicts	45	− .7
;alesmen	35	− .8
Jniversity Administrators	69	− .8

n Underwater Demolition Team personnel), and to Horace F. Stewart, Jr., Milledge-
lle State Hospital, Milledgeville, Ga. (on nurses).

population average of 5.5 stens. As usual, each full point of deviation in sten units represents one-half a standard deviation (from the through-occupations average). Total Anxiety level was computed from component scores on questionnaire factors Q_4+, $O+$, Q_3-, and $L+$, while neuroticism level was computed from $C-$, $E-$, $F-$, Q_4+, $O+$, $H-$, $I+$, and $L+$. Once again, we must note the restriction on definitive conclusions imposed by lack of objective test evidence.

Table 11–4 shows that Anxiety level is high in editorial workers, artists, science fiction writers, and general writers. These occupations seem to have, in common, relatively higher verbal ability, sensitivity, creativity, and perhaps emotionality. Verbal ability has indeed been found to go with Anxiety in childhood groups (Table 5–4), but it cannot be the only influence here, since presumably it is high also in low-Anxiety occupations such as university administrators and salesmen. The high-Anxiety occupations, especially the artists and writers, do seem to share what common parlance calls "sensitivity," and the low-Anxiety occupations, such as clerk, tend to lack it. On this hypothesis, the lower average anxiety scores of salesmen, university administrators, and convicts, would be the result of the disinclination of some sensitive people to take those avenues toward high income. As for creativity, it is certainly not all at the high Anxiety pole, for researchers (low Anxiety) must have it, whereas airmen and U.D.T. men (high Anxiety) are not particularly noted for it.

In general, the high Anxiety occupations have no monopoly on genius (sensitivity, creativity, emotionality)—certainly not if genius is equated with intelligence, since we already know that U.I. 24 Anxiety and intelligence are uncorrelated in the general population (Chap. 5) except perhaps for some relation involving verbal ability. In this general connection, Terman's work (213) agrees in showing that emotionality is not general to creative persons. In short, we can find no good evidence to support the concept of "genius and madness"—an ancient concept rooted in primitive folk culture, and verbalized by Aristotle, Diderot, Lombroso, and others (133, p. 3).

There is some evidence that the high Anxiety occupations are more stressful, using that term in a very broad sense. Thus, in the high-Anxiety occupations, writers and editorial workers have their pressures and deadlines, Airmen and U.D.T. personnel almost daily face real dangers,[4] elementary school teachers face elementary school children; artists (if tradition is to be believed) face starvation; and business executives face other business executives—and, in fact, are thought to be the very model of the man under stress.

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[4] The data on Airmen and U.D.T. personnel suggest that "willingness to venture" or "physical bravery" is associated with high Anxiety. This could be either cause or effect. In any event, no generalizations can be made, in view of findings in two studies (116, 191) that those who were "brave" and venturesome enough to volunteer for psychological experiment had, at the time of volunteering, a *lower* U.I. 24 Anxiety level than non-volunteers. The differences in trend of relationship could be due to (a) differences in the nature of the situation ventured into, as perceived or experienced, and/or (b) the fact that the psychological experiment volunteers had not yet faced the consequences of their venturesomeness (in terms of situation strain), while the Airmen and U.D.T. men had done so.

The lower Anxiety occupations seem to have in common a routinization which protects against having to meet the challenges of environment with free, lonely, and portentous decision; that is, these occupations seem to provide an escape from freedom—and anxiety—in Fromm's sense (98). Thus, the filing clerks, kitchen help, university administrators, and perhaps the psychiatric technicians and aircraft engineering apprentices, all have their set routines, prescribed channels, and "red tape" ready-made to bind anxiety by defining responses to any contingency or even by protecting against contingencies. (It is a mistake to believe that anxiety-binding techniques are created only by the resourcefulness of the individual, for often he has only to discover the occupation which provides them ready-made.) Again, the "occupation" of convict enforces a routine which by almost any standard is fantastically rigid, but at the same time offers an incomparable protection against outside influences.[5] Finally, one might be tempted to explain the relatively low Anxiety of research professors (and students, too) by involving the cliché about protection afforded by ivory towers. Perhaps researchers do have some extra protection against the environmental onslaughts that challenge the average man, but we suspect that most researchers would insist with us that research has at least its share of associated strains. One need only argue that they happen to be the types of challenge which tend to lower Anxiety (see p. 250).

The most important implication of the above discussion is that relatively permanent situational strains do apparently raise Anxiety level. Our failure to find any evidence for this in the direct experimental data analyzed in the previous section (Table 11–1) was probably due to an inability to apply, in an experimental context, the types of lifelike, and persistent situational influences, represented by occupational differences. Following the leads we now have, future research can come closer to formulating the appropriate variables for manipulative experiment, or at least set up, by selection of persons, more rigorous "natural variation" experiments of the type represented by our occupational data. For indeed, there is less difference than many suppose between analyzing the effects of a condition (a) by varying it deliberately and directly for a given set of persons, and (b) by selecting and comparing different groups of persons on whom different types of intensities of stimulus conditions are naturally operating, in the life context. The latter is discussed elsewhere as "the method of natural variation" (190) and is exemplified by the work of Beam (12) and others. It is of great promise for analyzing the effects of situational strains which are too lifelike, vital, complex, and permanent for laboratory manipulative experiment, but which, for this very reason, must be given top priority in any clinical application research. (See also methodological discussion, p. 346 and p. 419.)

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[5] Dr. Fred Damarin, Jr., Research Associate in Psychology, University of Illinois, reports a developing trend to *higher*-than-normal U.I. 24 Anxiety in analysis of data on convicts (as contrasted with the *low* Anxiety trend appearing in Table 11–4). However, Damarin's subjects were the thirty or so biggest troublemakers in a maximum-security prison of three thousand; that is, they were the convicts who least accepted prison regulations and routine, which, according to the above hypothesis, would explain their higher Anxiety.

The relation of neuroticism to occupation tends to parallel the relation of Anxiety to occupation, since the Anxiety score is one component in the neuroticism score (see p. 267). The biggest general difference between Anxiety-rank and neuroticism-rank of occupations is that the routinized occupations discussed previously tend to be higher in neuroticism than in Anxiety (see relative rankings for cooks, convicts, and filing clerks). The following other occupations, appearing in the data for the first time, also combine routinization with high neuroticism: housewives, janitors, waitresses, and, perhaps, to some extent, male bank clerks, secretaries, and barbers. These data are consistent with our previous supposition that certain occupations provide ready-made techniques for binding Anxiety, hence, they are characterized by relatively lower free Anxiety with, at the same time, relatively higher neuroticism level.

A slightly different way of looking at the routinization-neurosis association is that *non*-neurotic occupations and statuses tend to share the need for leadership, initiative, and problem-solving (e.g., firemen, salesmen, competitive athletes).[6] It is noteworthy that successful, face-to-face leaders in small groups are significantly less neurotic than followers (62, pp. 37 ff.).

The non-neurotic occupations do include social contact callings, like salesmen, but tend more to involve occupations dealing largely with things (engineers, electricians, and mechanics). Therefore, contrary to some popular clinical counselling assumptions, a liking for dealing with people is not necessarily a sign of freedom from neuroticism. It is true that Extraversion (a) does associate with freedom from neuroticism (p. 74) and (b) is increased by therapy (pp. 247 f.), but as operationally and precisely defined, Extraversion does not necessarily equate perfectly with liking to deal with people and, at any rate, at least five, six, or seven other factors have more powerful effects on the determination of neuroticism (Chap. 6). Therefore, if our sample of occupations keeps the same trend when extended, it may even turn out that dealing with material things, which follow inexorable laws (for example, the laws which govern accidental electrocution in the work of the electrician), is more exacting for the neurotic than dealing with people, who charitably permit some leeway. Or, if we look at the connection in terms of an occupation aggravating neurosis rather than in terms of accentuating it by selection, things can be as "cussed" as people.

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[6] Competition is mentioned here because we have no evidence of athletes in general being markedly non-neurotic. These were Olympic athletes and could doubtless be equalled in sheer athletic powers by many who could not, however, endure the waiting and perform in the limelight of international athletics.

Questionnaire measurement provides an adequate estimate of Anxiety but, relatively speaking, more is missed in respect to neuroticism by omitting objective-test measurement. Therefore, it is scarcely worthwhile to pursue any further detailed discussion of trends in Table 11–4, and we shall be satisfied simply to present the data without much further comment, hoping it will have value as a stimulus to developing theory and research. It is interesting, however, that the brave callings (Airmen, U.D.T.) group together at the high Anxiety pole but are at the opposite pole, or at least much lower, in regard to neuroticism (with Airmen and firemen lowest). The same lack of discriminating information from objective tests prevents our knowing why these apparently equally courageous callings differ so radically and, also, callously permits policemen and convicts to rub elbows in terms of neuroticism level. Obviously, future research must expand the range of measurement, as well as the range of occupations covered and the numbers in each occupational group.

In concluding this section on life conditions, two sets of data received recently are worthy of mention. The first relates to separation anxiety. Much has been written about this. Presumably, it is the outcome of frustration of the particular ergs concerned with dependence, gregariousness, etc., and shows itself in children removed from parents, in men drafted into armed services and removed from their families and customary occupational props, and in individuals morally isolated from their communities. Our only direct data thus far tend to support the hypothesis that separation and isolation are associated with Anxiety, for loneliness, (few friends) and certain other withdrawal variables do load on U.I. 24 Anxiety (Table 5–4 and 66). Some further relevant data are through the courtesy of Mrs. Anne Raman, Occupational Therapy and Rehabilitation Centre, Montreal, Quebec, Canada. The second-order Anxiety factor, F(Q)II, was measured in fifty-three disabled medical patients ranging from fifteen to sixty years of age. Thirty of these patients were classed as "visibly disabled" (e.g., leg amputations, cerebral palsy, arthritis, etc.) and twenty-three were classed as "not visibly disabled" (e.g., tuberculosis, cardiac condition, etc.). All fifty-three of these cases, however, share a special sort of differentness—that which is associated with physical failure of one sort or another. As compared to the average value for the general population, standardized at 5.5 stens, the average Anxiety sten value was 5.7 for the visibly disabled group and 6.4 for the not visibly disabled group. At first glance, it is surprising to find that visibly disabled patients are at essentially the same level of Anxiety as the general population, for there is certainly separation here, a literal separation from limbs in the ten amputation cases in the group and, for all the "visibly disabled" cases, an obvious loss of normal function and consequent isolation from society as being different from the norm. Perhaps the key to the puzzle is that the visibly disabled patient's differentness and physical failure, by its very obviousness, is accepted and even actively sympathized with by society and is therefore also more readily accepted by the patient himself. The not visibly disabled patient, on the other hand, receives less sympathy and acceptance and may even be treated as a non-conformist and eccentric; hence, he is really more isolated socially and more anxious.[7] Larger sample sizes are necessary to extend the excellent work begun here. But even now, at least one important working hypothesis seems indicated: that the fact of differentness must be accompanied by failure to understand and accept this difference and to be understood and accepted, if "separation anxiety" is to result.

There may be "separation neuroticism," too, for Rose and Stub's summary (186, p. 97) indicates a higher rate of psychoneurosis (clinically judged) among divorced females, as contrasted with widowed, married, or single females of marriageable age. The conclusion that there can be separation neuroticism operating here, assumes, of course, that the neurosis can be an effect as well as a cause of the divorce. It may also be that separation anxiety is a major contributor to the neurosis in this case.

Good data exist showing that females are higher than males on Anxiety, F(Q̰)II. Bendig (16) found by t-ratio that 407 U.S. undergraduate women were significantly higher than 475 U.S. undergraduate males on the questionnaire Anxiety factor; Warburton (see Appendix I here) found that female sex loaded +.44 on this factor in a sample of 112 graduate students in education at the University of Manchester in England; and Taylor (212) found a similar relation, but not attaining statistical significance. Related data in Rose and Stub (186, p. 94) show that females exceed males in neurosis (clinically judged) with part of the contribution to neurosis presumably coming from its Anxiety component.

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[7] The "not visibly disabled" patients were significantly higher in anxiety than "visibly disabled" patients (P = .001).

Presumably, most anthropologists and sociologists would agree that observed male-female differences in behavior are at least partly due to culturally imposed influences (148, 155), including the sub-cultures to which each sex is exposed in any given society. Eventually, then, the observed higher levels of Anxiety in the female (U.S. and British) can and must be incorporated in a broader system relating Anxiety to situation and stimulus. Illustratively and very speculatively, higher Anxiety in the U.S. and British female (relative to the U.S. and British male) could result from culturally imposed isolation from broader social and environmental-press contacts. (See housewives' neuroticism, involving Anxiety, Table 11–4; discussion of separation anxiety above; situational provocation data, Table 11–1; and emancipation data in the next section.)

Effects of Culture on Anxiety and Neurosis

This, our third and final category of influences is the most pervasive, permanent, and complex of all, though not unrelated to the previously discussed categories. Many of the influences so far considered for their neurosis and anxiety-producing qualities, e.g., occupational status and type, infantile toilet training, adolescent maturational demand, can be understood fully only in a cultural context.

There have been a considerable number of hypotheses concerning relative anxiety and neuroticism levels in different cultures, but very few of these hypotheses are supported by "hard" data, that is to say, by measurement on standard, valid tests. The first set of data to be reviewed is previously unpublished and considered here as only exploratory in nature. This evidence was gathered over the past several years in our laboratory and depended on the fact that 16 P.F. test items were available in the primary language of six different nations:[8] United States, Britain, France, Italy, Poland, and India (Hindi language). The sample size for each nation was quite large, as shown in Table 11–5, and matching was reasonably good from nation to nation as to sex composition, age, and education (most were students at about a technical school or junior college level). Unfortunately, however, data common to all six nations exist on only forty-four items, four each for the following eleven questionnaire factors: A, B, C, E, F, G, H, I, O, Q_1, and Q_4. The estimate of Anxiety level was based on the twelve item total for combined factors O+, Q_4+, and C−, the only major Anxiety-component factors measured here; the estimate of neuroticism was based on the twenty-four item total for combined factors O+.

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[8] Nations are the only easily definable unit of study now available but it is, of course, realized that this unit does not correspond one-to-one with culture.

TABLE 11-5

Relative Rankings of Six Nations on Anxiety and Neuroticism, as Measured by Questionnaire

Nations, from Highest to Lowest	Number in Group	Anxiety Raw Score. Possible Range is 6 to 30**	Neuroticism Raw Score. Possible Range is 6 to 54**
Poland	113	16.1	28.4
India	350	15.1	26.7
France	422	14.1	24.9
Italy	308	13.5	24.3
Britain	91	9.8	22.2
United States	108	7.1	21.1
Total	1,392		

* See text for background information on source, meaning, and limitations of these data. The Anxiety F(Q)II estimate was based on a composite of twelve items from questionnaire factors O+, Q_4+, and C−. The neuroticism estimate was based on these and, in addition, twelve items from questionnaire factors I+, E−, and F−.

**All possible t-ratio comparisons were significant in comparisons of one nation against another on Anxiety or on neuroticism, except for U.S. vs. Britain, and Italy vs. France, on neuroticism.

Q_4+, C−, I+, E− and F−, the major neurotic-contributory factors measured here (see Chap. 6). Obviously, the estimates of Anxiety and neuroticism are not as broadly based and reliable as one could wish, missing several Anxiety-component and neurotic-contributory questionnaire factors and lacking any objective-test support (see Chap. 6).

The Table 11–5 data show the following order from high to low Anxiety and also from high to low neuroticism: Poland, India, France, Italy, Britain, and the United States. All possible paired comparisons of nations showed significant differences by t-ratio, except U.S. *vs.* British and Italians *vs.* French in regard to neuroticism. The international differences in neuroticism are generally not as marked as those for Anxiety, but even this general statement is questionable, since the measurements were not intensive enough to separate Anxiety and neurosis clearly (as has been possible throughout the rest of this book). For convenience, we will speak mainly in terms of Anxiety, since the clearest differences seem to exist here and are based on three of the four most important Anxiety-component factors. It must be understood, however, that at least some elements of neuroticism follow the same trends as found for Anxiety; hence, statements made here about Anxiety also apply at least partially to neuroticism.

The only two related studies which used large pools of items for Anxiety and neuroticism measurement tend to confirm our results with fewer items. Professor S. Jalota, in a verbal summary of results on 374 questionnaire-factor items given to 225 students at Banaras Hindu University (124), notes that compared with American students Indian students are C—, I+, F—, E— and Q_4+. This would place them as both more Anxious and neurotic than their American counterparts, just as we found in our twelve and twenty-four item results (Table 11–5). Professor Frank Warburton compared 202 British college students with 604 American college students on the 187 items of the 16 P.F. (62). Analysis of his data for all 16 *Q* dimensions shows that British college students are at about the same neuroticism level as American college students, but somewhat lower on Anxiety.[9] The neuroticism finding is consistent with Table 11–5 data in showing no significant difference between the U.S. and the British groups, but the result on Anxiety reverses the Britain-U.S. trend in Table 11–5. Nevertheless, it is still not inconsistent that Britain is lower on Anxiety than India, Poland, France, or Italy.

Finally, as related data, we have Morris and Jones' (161) monumental work, pioneering in the systematic measurement of cross-cultural attitudinal and personality differences. In the period from 1945 to 1952, they collected ratings of thirteen possible "ways to live" made by large numbers of college students in India, Japan, China, Norway, and the United States (N's of 724, 192, 523, 149, and 252, respectively). Unfortunately, this important attitudinal data is not easily translatable into the Anxiety and neuroticism personality categories used in this book. However, their "way of life" 6 seems to us to have at least a suggestive resemblance to Anxiety. Morris and Jones summarize it as (161, p. 530): "Constant activity, striving for improved techniques to control nature and society." A fuller description (161, p. 524) notes that "a person must stress the need of constant activity [against the tendency of life] to become 'sicklied o'er with the pale cast of thought.' " Also, "We have to work resolutely and continually if control is to be gained over the forces of nature which threaten us," and man should "find his goal in the solution of his problems." All in all, this seems to us as an anxiety-produced way of life, which would be preferred more by the more highly anxious. The order of preference for way of life 6 from high to low was: India, China, Japan, Norway, and the United States (161, p. 527). On indirect evidence, then, we again find India higher than the United States in anxiety, with China, Japan, and Norway occupying the intervening levels.

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[9] The data described were contained in a personal communication to the authors, April, 1959. Drs. Warburton and Cattell are now preparing a publication on the study, to be entitled: "The Cross-Cultural Constancy of Patterns of Expression of Extraversion and Anxiety."

As for neuroticism, "anxiety" (way of life 6) is one aspect of it and the Morris and Jones study involves another way of life (#13), which suggests Submissiveness (factor E—), known to be an important neurotic-contributory factor. Way of life 13 is that in which, for example, (161, p. 525) "A person should let himself be used," also, "One should be humble, constant, faithful, uninsistent. Grateful for the affection and protection one needs, but undemanding." Considering preference for this way of life as an embodiment of neurotic-contributory Submissiveness (E—), we have the following order of nations, from greater to lesser submissiveness: China, India, Japan, Norway, and the United States. This is, again, indirect confirmation of Table 11–5 data, showing a higher level of neuroticism in India than in the United States. None of the other eleven ways of life even remotely suggest Anxiety or neuroticism to the present writers.

In summary, the level of Anxiety and (elements of) neuroticism, from high to low, goes approximately as follows: Poland, India, (China?), France, (Japan?), Italy, (Norway?), Britain, and the United States. In searching for cultural conditions associated with Anxiety level, the logical question is: What conditions are present to a greater degree in the higher-Anxiety nations and to a lesser degree in the lower-Anxiety countries? That is, what is there about the national-cultural (or perhaps racial) makeup of Poland which is consistently less prominent as we go down the national scale in Anxiety (India, France, Italy, Britain, United States)? There are a number of conditions which vary between these six countries in about the same manner as does Anxiety level. For example, co-varying positively with Anxiety between countries (that is, present more in high-Anxiety countries), we have lower real standard of living and a suggestion of less political freedom (in historical background or in present practice). Thus, Poland is an Iron Curtain country and in India political freedom has only recently flowered. Both nations have markedly lower standards of living than do Britain or the United States, where also, political freedom is more deeply entrenched in tradition and practices. The above list of presumptive anxiety-associated conditions could be enlarged almost indefinitely, but, one, we would still not necessarily cover national characteristics systematically and, two, we would not know the relations among the characteristics themselves. For example, are standard of living and political freedom to be discussed separately as distinct influences or are they organically related to one another and to other national characteristics, so that they must be dealt with as aspects or expressions of a single influence?

Solution of the above difficulties requires that we treat nations as individuals, correlating a comprehensive sample of national characteristics over a range of nations. This yields correlations between national characteristics (standard of living, urbanization, emigration rate, etc.) for the sample of nations studied. Such a correlation matrix can be factor analyzed to discover dimensions along which nations differ from one another, just as we have discovered dimensions along which individual persons differ from one another.

The past ten years has seen the launching of the inter-national factorization described above in studies (1, 30, 34, 37, 53, 102, 118) which correlated and factor analyzed a total of nearly one hundred different national characteristics over a range of nations (as many as sixty-nine in one study.) Here we need be concerned only with the five or six best-replicated factor-dimensions among nations. Among these, one stands out as involving characteristics which distinguish the high from the low Anxiety nations in our sample. In Table 11–6, this factor is described at its presumed Anxiety-associated pole, Narrow Poverty.

At the Narrow Poverty pole we find, generally: (a) a low standard of living (Table 11–6 loadings #3, 5, 6, and, possibly #1, 7, 9, and 12); (b) lack of emphasis on education (#10) and, related to this, (c) a lack of political and social emancipation in practices and in attitudes (#4, 11, 8); (d) a tendency to centralized authoritarian structure is glimpsed in high degree of government censorship of the press (#4), and possibly, too, in the low percentage of Protestants (#2).

The nations in our sample rank on the Narrow Poverty dimension almost exactly as they do on average Anxiety level. Thus, the United States and Britain have higher standards of living than India and Poland and are more emancipated politically and socially. Therefore, our working assumption is that Narrow Poverty is one of the most important cultural influences affecting level of Anxiety and neurosis.[10] It seems reasonable that there should be less to worry about (lower Anxiety) among citizens of nations whose fabric generally assures a fundamental material and political welfare. Indeed, there may be an analogue to the "jolly fat man," in the "happy fat society."

The inter-national connection between lower standard of living and high Anxiety (or neurosis) may or may not also hold within a given

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[10] Concentration on only one dimension-among-nations does not imply that this is the only factor associated with inter-national differences in Anxiety or neurotic trend. On the contrary, when more intensive personality data are available for a wider selection of nations, we fully expect that other matches will be possible between cultural factors and aspects of anxiety or neuroticism. Narrow Poverty is by far the clearest associate on the basis of present data, but even now another cultural factor, Unadapted Rigidity (*vs.* Vigorous Order) shows definite signs of involving characteristics which would be more prominent in high Anxiety nations (see 53, p. 414).

TABLE 11–6

THE INTERNATIONAL DIMENSION OF NARROW POVERTY (VS. ENLIGHTENED AFFLUENCE) AT ITS PRESUMED ANXIETY-ASSOCIATED POLE

*Loadings Above .50**

#1 Low level of sugar consumption per head
#2 Low percentage of residents of Protestant religion
#3 Low real income per head
#4 High degree of government censorship of press
#5 Low real standard of living
#6 Residents, as tourists, spend less money abroad
#7 High death rate from tuberculosis

Loadings from .35 to .50

#8 Sterilization of eugenically unfit tends *not* to be legalized
#9 Prostitution tends to be permitted
#10 Low expenditure (all sources) on education
#11 Percentage of female literacy low, relative to percentage of male literacy
#12 Relatively few eminent men engaged in commerce

*The characteristics are described as they appear at the "Narrow Poverty" pole of the factor. Exact loading values may be seen in the two studies which confirmed this factor (34, 53), plus a third study which was only suggestive in this respect, (37, p. 112). Since further replicating research is still needed, the table loadings have been given here only approximately and conservatively.

nation. This must be decided by more data. Rose and Stub's review of incidence studies (186, p. 103) does confirm a relation between higher income and lower neurosis within the United States as of 1936, but only over a starvation range from being "on relief" to $2,000 per year. This relationship reverses above $2,000 per year, showing *more* neurosis with higher income, a point to which we shall return soon.

The Enlightened Affluence pole of the factor (Table 11–6) practically epitomizes the Western world's concept of progress. Can we then assume that an inevitable upward march of material and social progress will eventually conquer mental disease? With our evidence and the evidence from Glazer's analysis (186, pp. 117 ff.)—indicating that psychosis was as prevalent in the middle years of the nineteenth century as it is today—we certainly have reason to hope that all three major forms of mental disease (anxiety, neuroticism, psychosis) are perhaps in retreat or at least are not making increased inroads. The common conviction to the contrary typically neglects the fact—clearly brought out by epidemiologists of mental disease—that increases in the number of persons undergoing treatment for mental disease may be accounted for largely by betterment of facilities and more enlightened attitudes regarding mental disease.

The world-wide prognosis for mental disease can legitimately be optimistic, if this optimism is tempered by qualifications of the type listed below.

1. Anxiety and neuroticism are not all there is to mental disease, but we have test evidence only for these two afflictions, and even for these, the data are not comprehensive enough for definitive conclusions.
2. Even if the Enlightened Affluence–lower neurosis connection continues to be confirmed, we cannot assume automatic, inevitable material and social progress (operationally defined here as world-wide movement toward the Enlightened Affluence pole). History warns us of catastrophic retrogressions, and today's newspaper headlines certify that vast areas of the earth still suffer from material want, political repression, and ignorance. Thus, even if material and social progress proves to be the best world-wide therapy, the availability of this therapy cannot be taken for granted.
3. Our data are static and cross-sectional, indicating only that Anxiety and neurosis are relatively less severe in affluent, emancipated nations at the present point in time. Logically, there could still be an across-the-board increase in mental disease for all nations, due to cultural conditions not yet analyzed here, while affluence merely slowed the rate of increase for some nations. Similarly, a trend to increasing anxiety in the United States could still exist and not be inconsistent with a higher present level in other nations, for, historically, these other nations could have originally had a much higher level and they could also be increasing now at an even more rapid rate than the United States (due to Narrow Poverty and other influences).
4. Factors associated with between-nations Anxiety differences do not necessarily act in the same way within nations. However, there is some suggestive confirming evidence. First, Bendig and Hountras (18, Table 2) found a consistent tendency to positive association between U.I. 24 Anxiety level and Authoritarianism, among U.S. college students. The same type of trend was noted between nations (see p. 276). Second, general observation suggests that neurotics tend to be of relatively lower educational level than normals, and in one study (193), we have confirmed a loading of low educational level on Neurotic Regressive Debility, U.I. 23−. We have also shown that, on the average, Anxiety and neuroticism tend to decrease educational attainment in making for lower school grades, etc. (see pp. 263–64). Again, this evidence could relate at least indirectly

to the between-nations trend, which shows less attention given to education in Narrow Poverty, high-neuroticism countries (loading 10, Table 11–6).

Finally, Rose and Stub's data (186), cited earlier (p. 278) indicate that the inter-national neuroticism-poverty association does exist within the United States, but only in a very low income range. At higher income levels, the direction of relationship actually reverses (neuroticism with affluence). We speculate that the other five nations sampled are operating at something closer to the U.S. low-income range, within which the trend held; hence, the trend holds between these nations. Also, the United States as a whole has so recently risen above the standard of living represented by this income that it has yet to register the possible neurotic effects of too high income and hence is still somewhat lower on Anxiety and neuroticism than the other nations sampled. (Parenthetically, it should be noted that there are influences other than standard of living which might also account for a lower level of Anxiety in the United States. One of these is discussed below.

In summary, to the qualification noted above—that "Social progress therapy" is not automatically available as needed—must be added the qualification that it may only operate therapeutically within a relatively restricted subsistence range and may actually raise Anxiety or neurosis level as it varies above that range.

5. Finally, there is the usual cause-effect tangle. To some extent higher Anxiety and neuroticism could produce material and social impoverishment as well as be produced by it.

The foregoing discussion helps to explain the finding—probably surprising to many at first—that the United States is relatively low in Anxiety. The hyperactivity, the competitive striving, the fast pace of life—all could easily lead one to expect high Anxiety. But, as pointed out earlier, there is the compensation of basic wants provided and also the fact that Anxiety can be reduced by exposure to relatively temporary challenges (p. 250). The American environment certainly provides these in abundance. In fact, what many commentators on the United States have perceived as "anxiety," may actually be the easily confusable but essentially independent factor of Effort Stress, P.U.I. 4 (38), which is an effort at control in response to challenge. General observation certainly suggests that Effort Stress runs high in the United States, a land of ambition, competition, and challenge. We have no direct evidence comparing nations on the factor, but there is a dimension among nations, called Cultural Pressure (34, 53), on which the United States tends to be high,[11] and which could very well be the between-nations expression of the Effort Stress personality factor

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[11] This factor was not related to Anxiety in our discussion because the other five nations in our sample do not rank on it in the same order as they do on Anxiety level.

(P.U.I. 4). America also tends to be high, relative to four other nations, on Morris and Jones' attitudinal factor C, "described as outward activity for the sake of progress in the control of the world" (161, p. 530). Again, this factor looks like an embodiment of Effort Stress.

More research is needed on this point and, in general, a wider range of personality measurements must be applied to a larger sample of nations and sub-cultures within nations. Personality measurements on nations can then be entered into the same correlation matrix as other national characteristics (urbanization, standard of living, etc.). The resulting inter-national factors will have their relation to personality factors precisely specified, in terms of the loadings of the latter on the former. Thus the loadings of average Anxiety level for a culture, on each of a set of cultural factors, will reveal the exact nature and extent of its association with these factors.

Summary

1. Clear definition of response dimensions must precede systematic discussion of stimuli (independent variables) which influence the development and level of these responses. The preceding chapters have defined Anxiety and neuroticism as response patterns, in both trait and state forms, in physiological as well as psychological data, etc. For purposes of the present chapter, they are considered the dependent variables.

2. A given event or structure can often be considered either as "cause" or as "effect," depending on what the investigator intends to explain, the viewpoint he adopts, etc. Here, however, independent variables are sought among phenomena such as interview stress and therapy, which are more intelligible as causes than as effects. Further, Anxiety and neurotic-contributory factors are considered primarily as dependent variables or effects, not as causes.

3. The response dimension of Effort Stress (effort at control) has not yet been clearly related to neuroticism as clinically judged, but it does show an increase to temporary challenge situations, such as is often naively expected of Anxiety (but fails to occur). Probably, Anxiety and Effort Stress are often confused conceptually—what is actually an Effort Stress response being called, loosely, anxiety. But the fact remains that these two dimensions are essentially uncorrelated and of quite different response nature.

4. In normal (non-institutionalized) persons, Anxiety is very high during the adolescent time of troubles, but then drops sharply and remains at moderate levels throughout adult life, until old age (above sixty years), when it rises very sharply. Neurotics actually have slightly lower levels of free Anxiety during adolescence, presumably due

to some binding processes, but their Anxiety tends to remain constant, or rise slightly throughout life, and is always at an above-normal level. Anxiety is determined primarily by environment rather than by genetic constitution and, within environment, more by accidents of individual experience than by family-wide atmospheres. Some of the environmental mechanisms involved are reviewed below.

5. The evidence is that Anxiety is negligibly affected or even lowered by the application of briefer, provocative, "stress" situations (imminence of academic examinations, stress interview, parachute training, etc.). Apparently, the vague fears of Anxiety are actually alleviated by confrontation with a concrete stress situation about which the person believes he can do something. Anxiety rises only when the person is removed in time from the situation or otherwise convinced that nothing can be done about it (for example, told he has already failed an exam).

While immediate involvement in briefer challenge situations tends to lower Anxiety, evidence is that more powerful, lasting strains can raise Anxiety.

Comparative data on occupations show, for example, that business executives, editors, etc., have higher Anxiety levels than persons in more routine, placid occupations (e.g., kitchen help, filing clerks, university administrators). Data on tests loading the Anxiety factor on disabled patients, on old age, and even on sex comparisons (females have higher Anxiety) indicate that Anxiety level is raised by isolation, separation, and differentness, especially in so far as the differentness is not understood or sympathized with, by society. Data comparing the Anxiety level of six to nine nations suggest that Anxiety is raised by cultural conditions such as low standard of living, political repression, unemancipated attitudes, and, perhaps, general low level of education. Thus, Poland and India have the highest Anxiety; the United States and Britain the lowest. Indications are that these conditions also operate in the same way within a given nation, but not necessarily over the entire range of possible variation. Thus, there are some data within the United States linking high Anxiety with authoritarianism, lower income, and poorer academic performance.

6. There is no such thing as a single neuroticism response to environmental stimulation. Neuroticism has many distinct components, each of which behaves differently and is determined differently. Thus, first, the neurotic-contributory factors range from those heavily determined genetically (U.I. 1, 20) to those heavily determined environmentally (U.I. 16, 22, 28, etc.). Second, some neurotic-contributories show increase with age; others remain relatively constant; and still others decrease with age, although the composite trend indicates (a) for normals, a slight decrease to age sixty and an increase there-

after, and (b) for neurotics, a constant level or slight increase throughout life. Third, most neurotic-contributories interfere with educational attainment, but others do not affect it or actually facilitate it. And, finally, some neurotic-contributories, notably Pathemia, are increased by temporary situational challenges, while most others are moved away from their neurotic-associated poles.

7. The association between high temporary provocation and healthy response is the most frequent one found among neurotic-contributory factors, including Anxiety (see 5 above), but optimism about the possible effectiveness of a graded stress therapy must be tempered by the following considerations. One, the effects of a given type, intensity, and length of stimulus situation cannot be predicted merely from inspection of the situation itself. Rather, its response associations must be empirically determined, for similar-appearing conditions have different response effects—intense, prolonged "stresses" may produce deterioration even though when they are applied temporarily at a lower level of intensity, they alleviate neurosis, etc. Two, in any event, a given condition tends to have effects along more than one neurotic-associated dimension (multifactor theory of stimulus condition effects) even increasing some while decreasing others; hence, before choosing conditions, the therapist must decide which neurotic-contributory dimensions he wishes to affect.

The unpredictability of response effects from sheer a priori inspection of situational characteristics is also illustrated by some preliminary data on the effects of therapy (at one clinic) on emotional problems of neurotic type. As expected, therapy lowered Anxiety and Introversion, but it had only negligible effects on the important neurotic-contributories of Pathemia and Resignation.

8. The observed nature and mode of environmental determination of several neurotic-contributory factors permits inferences as to the broad life-influences which molded them. Thus, the effects of overprotective, overindulgent family atmospheres are suspected in the development of Premsia (U.I. 16−); libidinal conflict at about 2–5 years of age in the development of Rigid Superego (U.I. 28+); neglect of general education (to deal critically, rationally, and objectively with the environment) in Pathemia (U.I. 22−); more or less accidentally varying incidences of trauma and/or effects from physical illnesses, such as glandular, or brain injury in Neurotic Debility (U.I. 23−) and in Low Adaptation Energy (U.I. 29−).

9. Further research is needed to confirm and expand the exploratory data reviewed here. Generally, such research should (a) increase the range of stimulus types and intensities used, employing "natural variation" methods, where appropriate, and (b) increase the numbers and types of persons tested.

CHAPTER 12

EXPLANATORY PRINCIPLES IN THE MULTIFACTORIAL THEORY OF NEUROSIS AND ANXIETY

Given Facts and the Theoretical Objectives

PROBLEMS OF INTEGRATED OLD AND NEW METHODS. At this point most of the new facts at our disposal have been set out. They include findings on differences of neurotics and normals on structured personality measures, the forms of change of Anxiety and other states, the effects of total personality upon symptomatology, and the relation of neurosis and anxiety to cultural and general environment, etc. Considerable theoretical development is already implicit in the methods and concepts used and in our organization of experimental investigation, but now we must formulate theoretical concepts explicitly, and this we shall do in this and the chapter following.

Our theoretical formulations will differ from most in the clinical field at the present time in being based on a hard core of systematically interrelated measurement concepts, and in permitting a succession of exact verifying experiments which should be stepping stones to an expanding theoretical development. In the present theoretical integration we are faced by two main difficulties:

1. We are putting old and new wine together. We wish to depend upon those central concepts in psychoanalytic and other pre-metric clinical experiences which may be regarded as fairly well proven by experience, while avoiding elaborations which may be in the least suspect. Here we have cut away suspect tissue to a far greater degree than most clinicians would want to do, while declining to agree with some experimentalist friends that pre-metric ideas should be jettisoned *in toto*. One way in which we can successfully make the transfer is to substitute the hard coinage of factor concepts for general observation concepts, such as ego, superego, etc., which they apparently substantiate. Henceforth, ego strength, in ongoing metric research, can mean factor F(T)II, which can be reliably measured and around which various confirmations and extensions of the alleged properties can accumulate. We are also borrowing certain process concepts, such as repression, sublimation, and conflict, and these, too, become operationally defined.

2. Our metric, experimental data have been obtained necessarily by cross-sectional experiment largely, since there has yet been no time for developmental studies with these methods. Thus, the statement that a particular existing personality pattern is the result of certain childhood experiences, for example, that F(T)I+ is Tied Socialization and F(T)V, a history of Inhibiting Environment, must rest at present on an inference from the pattern of qualities associated. Only in a few instances (see Chap. 11) have we been able to include the first returns from developmental study.

The result of these restrictions on information is a greater degree of freedom in hypothesis formation. However, where we cannot genuinely feel that one hypothesis is better than another, with present facts, we have stated both. In a succession of hypotheses this necessarily leads to a proliferation of several alternative systems, each a set of mutually interlocking parts. It has seemed desirable, in the interests of maximum guidance of future research, to state these double and treble hypotheses, though often the appearance, perhaps next year, of a single well-confirmed factor experiment would precipitate out one system from these speculative alternatives. However, such regard for possibilities means a jigsaw puzzle with many alternative pieces in hand, and an argument bristling with "ifs" and "buts" directed to future research confirmation. Such an approach is perhaps trying to the practitioner, who must act routinely on definite assumptions, but it is the lifeblood of research, for it shows quickly where the crucial experiments are required to crystallize firm theoretical structures.

In terms of the factual range included in our theorizing, it will be clear that it is far wider than is usual. It extends from anthropological findings to physiological ones, from observations on environmental learning influences to indications of hereditary genes, and from clinical to psychometric observations. As to assumptions, in regard to formal methods and models, we have permitted possibilities of both linear and non-linear relations; examined positive and negative feedback relations; considered structural concepts based both on individual difference (R-technique) and time sequence (P-technique) perception of factor entities; and have used a special factor analytic model (free to go oblique) which permits the appearance of several orders (rather than a single order) of factor structures (if they exist). However, since this attack is necessarily a first approximation, the multivariate correlational techniques by which we have tried to master most of this broad domain have necessarily taken, in our final picture, a linear approximation to whatever might be non-linear. Naturally, in what follows, space dictates that we often make no mention of numerous possible alternatives that have actually been theoretically explored by us and rejected, i.e., there is not always space to give the full reasons for the theory preferred finally and set out here.

Summary of Outstanding Facts to be Integrated

Although a full collation of the experimental facts to be integrated would seem a necessary beginning, any attempt here to re-hash the detailed findings out of the freshness of their actual context would prove as dry as an auto-parts catalogue. It is perhaps best to assume general familiarity with the eighty or so factual conclusions summarized in Chapter 6 and in the concluding sections of the preceding eleven chapters. However, it would still be helpful to present a highly condensed reminder of the more outstanding of these psychometric and experimental conclusions, shorn of the qualifying clauses complicating their recording elsewhere, as a basis for proceeding.

1. Neurotics do not differ from normals in a single factor but in several factors (at a statistical significance of $P < .05$ or more). The direction of deviation is psychologically correct in terms of previous interpretations of the meanings of these factors. The differentiating factors have been divided into five neurotic process (np) and four to six neuroticism-contributing (nc) factors.

   This shift from a one-factor (86) to a multifactor theory of neuroticism interestingly parallels the current trend in physical medicine, which, as one recent reviewer points out, is in transition from single-cause thinking, stimulated by Pasteur's finding of the germ, to a multifactorial view of disease as a dysfunction of the whole organism.
2. Some of the above factors are largely innate; others largely environmentally determined, some apparently about equal.
3. The neurotic process factors alone can account for a substantial part of the variance between normals and neurotics in neuroticism. Taking all the now measurable primary personality factors into account, a multiple correlation of 0.6 to 0.9 can be obtained with neuroticism, as judged clinically (placement as neurotic *vs.* placement as normal).
4. Alternative, but mutually integrating, descriptions of these differences can be given in terms of rating (L), questionnaire (Q), and objective test (T) data; and in terms of first-order, second-order and third-order factor resolutions. At no level, however, is clinically judged neuroticism accounted for as a single factor. The divergence of psychotics from normals is quite different from that of neurotics (Chap. 6).
5. Anxiety, a first-order T data (which tends to parallel second-order L and Q data) factor is a functional unity, which is not co-extensive with neuroticism, and exists at appreciable levels in normals

but tends to run higher in neurotics; that is, it constitutes a neurotic-contributory factor.

6. In terms of its first-order components (*L* and *Q* data), Anxiety is a product of Ego Weakness (C−), Ergic Tension (Q_4+), Guilt Proneness (O+), Defective Integration of the Self-Sentiment (Q_3−), and Protension or Suspiciousness (L+), etc. Alternatively or additionally, some, but not all, of these may be regarded as consequences of Anxiety.
7. Besides the main, conscious anxiety factor, dimensions can be found which could be considered as corresponding to the clinician's bound anxiety, notably F(T)V and F(T)VII, though the interpretations cannot yet be final; first-order factors U.I. 17+, 18−, 21−, 23−, and several others which also deserve consideration. Speculatively, F(T)I+ and F(T)III+ are suggested as related to the clinical concept of unconscious anxiety.
8. The different psychiatric syndrome categories clinically familiar in neuroticism are clearly recognizable by different questionnaire factor profiles. They are explicable primarily by different emphasis on neuorsis-contributory factors, but also, to a lesser degree, by different combinations of neuroticism factors with general personality factors. For example, psychosomatics differ most from other neurotics in having lower Anxiety, lower Pathemia and higher Promethean Will. Anxiety neurotics are high on the Anxiety factor and compulsives are low on the Promethean Will factor, and so on, with factor profiles which are properly measured permitting separation of syndromes.
9. By multivariate analysis over time, and in response to stimulus conditions, it has been possible to demonstrate some thirteen independent dimensions of mood change, i.e., state patterns, notably Anxiety, Torpor, Regression, Pathemia, Diurnal Fatigue, Subduedness, Effort Stress and others.
10. Significant physiological concomitants have been demonstrated for these states, and a clear differentiation has been gained for the "stress" states of Anxiety, Effort Stress, Adrenergic Response, etc. Second-order structure is also demonstrable for states, indicating Adaptation Stress (*vs.* Withdrawal) and Frustration Response as the main dimensions.
11. Less widespread but still significant physiological associations have also been shown to exist for personality traits. The neuroticism-contributing trait factors are associated mainly with subnormal physiological function. Somatic characteristics, e.g., small size, poor musculature, also relate to neuroticism and Anxiety.
12. There are significant differences in neuroticism and Anxiety levels, measured in terms of factors, for various occupations, ages, roles, nations, etc.
13. Neuroticism and Anxiety factors change significantly with experimentally applied conditions. Effort Stress, more than Anxiety, is

a main response pattern to concrete dangers, and Pathemia to emotional upsets and frustrations. In so far as Effort Stress is a response to psychological stimuli, it is a sign of willed control of emotions of the most diverse, intrinsic nature. Anxiety, by contrast, is little tied to the immediate situation, but appears as a response to symbolically represented, signalled, remote threats to ergic satisfaction and self-regard, to which immediate response is not possible. The chief neurotic factors actually tend to be reduced by immediate challenges.

14. There is a probability that a greater degree of poverty and political repression in a culture pattern increases Anxiety and neuroticism, although the relation is quite complex, probably involving several cultural factors, and not necessarily operating within a culture exactly as it does between cultures.
15. From the nature of the response content of personality factors associated with neurosis, as well as their age curves of development, it is possible to assign the determination of individual levels on certain factors more to childhood and others more to the adult period.
16. An additional source of factual evidence, described elsewhere (44) and discussed in detail in the chapter following, but equally important in our final conclusions, is that concerned with the definition and measurement of motivational factors. The facts here are that distinct drive factors can be isolated and measured, and that a measurement of conflict of these drives, in the total life interest realm, correlates substantially with clinical estimates of total maladjustment.

To remind the reader of a shorthand used in this and other summaries—indeed consistently through this and other books—we would repeat that *L* data means observations on personality in the life setting (quantified by rating or time sampling). Similarly, *Q* data consists of self-evaluation response quantified from questionnaires; while *T* data consists of measurements from objective tests, that is, behavior in standard miniature situations in which the subject tends not to know those factors on which he is actually being measured.

For the purpose of keeping the above findings and the main personality concepts involved readily at hand in these two chapters on theory, a summary has been presented in Table 12–1 of the titles, general nature, and universal index numbers of the principal factors found distinguishing neurotics and normals, together with titles of the state factors and the correspondences of state and trait factors. It should explicitly be noted at this point that titles of certain factors have changed slightly from those used in previous writings and at the outset of this book, as a result of findings in this book. It is appropriate, inevitable, and desirable that the title of a factor should move along as later research develops the theory of its nature. The unchanging reference to the reality which is a factor pattern is its Universal Index or U.I. number (45) and these U.I. numbers were set up with regard to the need for such stability. But the labels, which represent descriptive and interpretive advances, are bound to change, though an attempt is made to retain recognizable continuity. Thus, U.I. 16+, first labelled Assertion, has become, with increasing evidence, adjectivally specialized as Harric Assertiveness, implying the independent spirit of Harria versus the overprotection of Premsia (44); while the previously unnamed lower pole of U.I. 19+, Critical Practicality or Promethean Will, has become labelled Resignation or Subduedness. It would help understanding of factor analytic work if those relatively unfamiliar with it would appreciate the need for this progression in factor concepts and terms, just as in any other experimental concepts.

In stating the main relations found to be appreciable and significant we have also attempted to indicate where the evidence favors the conclusion of an essential absence of relationship, which is just as important for theory. For example, we have shown that psychotics are not distinguished from normals by the same factors (pattern) as are neurotics, that some important trait patterns do not appear as state patterns, etc., for these are equally definite facts which, in time, will be integrated. Among the chief absences of expected relations to be noted is that no questionnaire second-order factors have yet been found corresponding to the neuroticism-contributing *T* data factors U.I. 20+, 21−, 23−, 28+, and 29−. Present research, naturally with *T* and *Q* data factor batteries of imperfect reliability, shows that these *T* factors do have certain fragments of their variance accounted for by primary *Q* data factors (see 44, p. 326), and, conceivably, Superego (U.I. 28+), and Adaptation Energy (U.I. 29) could eventually be fully aligned with *Q* data factors, as research proceeds. But since the 16 Personality Factor Questionnaire (16 P.F.) substantially covers the general realm of introspectible self-evaluation, it seems an inevitable conclusion that others of these, notably Comention (U.I. 20+) and Neurotic Debility or Regression (U.I. 23−) may correspond to dimensions of neurotic behavior that are not consciously recognized by the subject, even as behavior.

Among the chief possible causes for these lacunae in the possible alignments of questionnaire objective test factors are these four. First, some *T* factors correspond to introspectible experience or observable action (*L* and *Q* data) which is so specialized and peculiar that it has not yet been included in the personality sphere sampling. Second, the experience might be not only purely introspective, but of a kind which

TABL

SUMMARY OF INFORMATION AND INTERPRETATION, FO

(See also Tables 5–1

1. At First-Order Objective Test Factor Level

Universal Index No.		*Neurotic Process (NP) or Neurotic-Contributory (NC)*	*Significance of Association with Neuroticism, and Sign of Direction*	
U.I. 16	Harric Assertiveness vs. Premsia.* No corresponding state factor known. Environmentally determined; fixed early.	NP	.001	(–)
U.I. 17	Timidity-Inhibition vs. Lack of Timidity. Tentatively, believed to appear also as P.U.I. 12. Increases with age. Moderately high hereditary component.	NC	(Possible slight)	(+)
U.I. 19	Promethean Will vs. Resignation. State factor P.U.I. 11. (Spiritedness vs. Subduedness). Substantial heredity component. Q 2nd-Order, N, E, Q_1.	NC	.01	(–)
U.I. 21	Exuberance vs. Low Spontaneous Energy. No state factor. Falls rapidly over early age range. Substantial heredity component.	NC	.01	(–)
U.I. 22	Corticalertia vs. Pathemia. State factor P.U.I. 2. (Elation vs. Frustration-Depression). Environmentally determined. Increases rapidly with age. Q 2nd-order, A–, I–, N.	NP	.001	(–)
U.I. 23	Mobilization vs. Regression. State factor P.U.I. 8. (Mobilization vs. Overwroughtness). Age change as in intelligence curve. Slight to moderate heredity.	NP	.001	(–)
U.I. 24	Anxiety. State factor P.U.I. 9. Curves high in adolescence. Slight heredity. Q 2nd-order, C–, Q_4, L, O, Q_3–.	NP	.01	(+)
U.I. 25	Careful Realism vs. Eager Subjectivity. No state factor.	NC	.10	(–)

-1

ACTORS (TRAIT AND STATE) INVOLVED IN NEUROTICISM

-3, and Diagram 6–2)

niversal ndex No.		*Neurotic Process (NP) or Neurotic-Contributory (NC)*	*Significance of Association with Neuroticism, and Sign of Direction*	
.I. 28	Rigid Superego vs. Zeppia. State factor P.U.I. 10. (Asthenia vs. Zeppia). Slight age decrease. Largely environmental.	(Probably NC, .01 for true neurosis but opposite direction for sociopathy)		
.I. 29	Responsive Will vs. Low Adaptation Energy. Possible state factor P.U.I. 3. (Diurnal Fatigue). Age curve as for intelligence. Highly environmentally determined.	NP	.001	(−)
.I. 33	Invia vs. Exvia. State factor in Q data. Q 2nd-order, A−, F−, H−, $\bar{Q}_2$, M.	NC	.01	(+)
.I. 34	Autia vs. Concern for Standards. Possibly, a state factor in Incremental R-technique.	NC	.01	(+)
.I. 36	Self-Sentiment Development vs. Poor Self-Sentiment Development. State factor in Incremental R-technique, possibly, P.U.I. 6.	NC, Inferred	(Negative association, at NC level, inferred only, from test content)	(−)
	2. At Second-Order Objective Test Factor Level			
F(T)I	Tied Socialization (Superego vs. Low Cultural Introjection.		.001	(+)
F(T)II	Expansive (Strong?) Ego vs. Poor Emotional Problem-Solving.		.001	(−)
F(T)V	History of Inhibiting Environment vs. Little History of Inhibition.		.05 to .10	(+)
F(T)VI	Narcistic Development vs. Responsiveness to Environmental Disciplines.		.01 for sociopathic neurotics but not for true neurotics	(+)

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*The pole of the factor which, according to the sign in the last column, is associated with neuroticism, is underlined in the title.

can be only solipsistically standardized (44, p. 496). That is, it is purely introspective and not of a kind in which a person can meaningfully compare himself quantitatively with anyone else, for example, how green is the green he sees? How exuberant does he feel? How much effort does he exert to count (re: U.I. 23—)? How vividly does he see images (U.I. 25—, perhaps)? The resulting correlations of such incomparable estimates would be random. Third, certain behaviors are largely neurophysiological in expression and no more open to the observer than a subject introspecting his eosinophil count, or, a diabetic, his insulin deficiency. And, finally, the differences concern dynamic behavior which is entirely unconscious in the psychoanalytic sense.

Probably all four causes are operative, and often simultaneously. For example, the poor capacity to mobilize one's resources, measured in U.I. 23—, Regression, is sensed to a degree, very slight but real, in the questionnaire responses of C—, Ego Weakness, and possibly O+, more Guilt Proneness. But some correspondence is probably missed for the first reason above, that is, by the absence of specialized questions such as "Do you find it difficult to hold a visual image three seconds or more?"; for the second reason, because a question such as "How slowly do your ideas move?" admits no valid inter-personal comparison; for the third reason, because the main influence may indeed be an adrenal impoverishment or the like. It suffices, for clarity of subsequent conclusions, that if these reasons are valid, much of the normal-neurotic difference which we do not pick up in one medium or measurement we are likely to pick up in another, and that we know definitely when *Q* and *T* data factors are the same or independent dimensions. It is necessary to have this degree of open-eyedness about what is contained in the consulting room questions and what is not, and is obtainable only through objective test measurement.

A limiting character to our observations which is more real and which could limit our theoretical conclusions is that certain differences of neurotics from normals may exist which are not yet caught in any of our factors. Incompleteness of sampling of variables is a normal hazard of all scientific work, which only time can clear up. However, there are reasons for believing that most of the difference is already covered in our roll call of factors. First, the factors themselves approach behavior through all three possible media; second, they operate on members of the general population; and, third, they are deliberately widely sampled, on a framework, in each medium.

Even so, it is true that a few neurotic factors could be present only in extreme behavior, as hallucinations are extreme behavior present only in a psychotic group to any extent, and these might be missed. Elsewhere (p. 150) we have discussed the role of skewed deficiency factors, but it would seem likely that, by our use of both normal and abnormal groups, we should have caught such one-sided dimensions, too. Furthermore, though the estimate of connection with neurotic-normal differences is rough, the magnitudes of the multiple correlations already found with the criterion (p. 77) suggest that, since most of the factors are approximately orthogonal, the multiple correlation will continue to be high and could account for most of the variance in neuroticism. This important point should be checked as soon as improved scales for the factors are available.

Schematization of Adjustment and of the Etiology of Neurosis in the Adjustment Process Analysis (APA) Chart

With this glance at the range, essential nature, and limitations of our empirical data distinguishing neurotics and normals, we are ready to turn to theoretical discussion. Some of the discussion is rightly concerned with the nature of the dimensions, and with psychophysiological mechanisms, but a large part of the theory concerns the developmental process—the way the neurotic became what he is. At the present point of data assembly the prediction of who is, or is likely to be, a neurotic is little more than an actuarial statement. The "little more" is still important, for if we had simply obtained a good statistical prediction, and no more, from a conglomerate of tests, our etiology would be defective in a very vital respect. That is, the prediction would hold only for the given sample and for the given type of prediction situation, e.g., neurotics among adults. It would be without insight as to more remote causes or history and would integrate with no general body of psychological laws. By contrast, our prediction is from factors—established functional unities which are known to be meaningful, to have appeared as structures in other age groups and situations, and, potentially, to have many psychological laws attached to their operation. Unfortunately, however, we are still at a research stage where we can only speculate about or rather unreliably infer from sketchy data the genesis and life-course of these factors.

Our purpose is to formulate the most promising alternative theoretical structures on this fragmentary evidence, but also to work out more exact methods for tackling the questions which arise. All etiology has to consider both (a) hereditary, constitutional endowments, predisposing to experiencing the normal environment as frustration or deprivation, and reacting by conflict or repression as well as through a low threshold for the manifestation of subsequent exhaustion or other symptoms; and (b) environmental history, deviating from that of normals in severity of personal trauma, familial upbringing, the imposed educational hurdles, etc., in the culture pattern. Both the hereditary and environmental influences can come into operation repeatedly, at quite different life stages and phases of the neurotic process. Furthermore, our explanatory model must consider interaction effects which appear only when specific conjunctions of factor growth and time are satisfied, and it must envisage positive and negative feedback effects. The statistical analyses and the employment of formulae to bring out these connections obviously will prove a complex undertaking.

Existing clinical theory has notoriously neglected the roles of hereditary influences, as well as (if our analyses are correct) the effects of environmental differences in familial educational atmospheres—in favor of the more dramatic individual life incident. Such "dynamic" explanation always has the entertainment value of the theater, the short story, or the village gossip. This is not to deny that there still remains a good practical reason for concentrating on the dynamic aspects. For at present, the motivational tangles, rather than the hereditary defects or culture pattern situations, seem to be the only entities the practicing clinician can hope to manipulate. What is lacking in this reasoning is the recognition that good manipulation also depends upon understanding things which cannot be manipulated. Wise clinicians thoroughly appraise these other factors. They realize that the neurotic emotional tangle encountered in a given person would not have led to a neurosis in a person of different temperament, and that the way out of the neurosis needs to be guided in terms of the adjustive limits set by a particular individual's general hereditary endowments.

Although such a warning may be unnecessary for the research-minded clinician, it is realistic to recognize that many psychoanalytically trained clinicians are likely to feel theoretically at sea when they do not immediately recognize their favorite motivational factors among the experimentally determined factors here found statistically to be associated with neuroticism. For these, it should be reassuring that we now propose to consider the motivational situations in essentially the same terms as those in which dynamic explanations commonly handle them. The novelty will consist in our translating dynamic concepts into experimentally verified structures. Indeed, we propose to ask how the main statistical differences of neurotics and normals, in the chief personality factors, can be accounted for, chiefly, by varying histories of frustration, regression, conflict, and unsuccessful repression.

Methodologically, one should recognize that at this point a quantitative treatment of personality needs to be related to an equally quantitative description of environmental stresses and satisfaction. Indeed, a truly scientific treatment requires (a) a comprehensive taxonomy of contemporary culture, with a theoretically clear measurement system of the psychologically important stimulus and learning situations encountered in the life of the average man, and, (b) an Adjustment Process Analysis, which is an abstraction and reduction to a system of the sequences of response possible to the organism in the course of its goal-seeking behavior, in trying to reduce drive tension. The latter would provide a paradigm of adjustment activities—a standard sequence of dynamic experiences which would typically occur repeatedly, over the series of important stimulus situations described in the taxonomy. Initial steps toward both of these goals have been made by Cattell, through the mathematical model for typing and measuring environmental situations suggested recently (44, p. 426), and the Adjustment Process Analysis (worked out in 1950) around the notion of dynamic crossroads or successive choice-points (33) in the adjustment of organisms.

These two concepts are fundamental to our further theoretical and methodological treatment, but we can dispense with any detailed consideration of the situational taxonomy, since it is systematically introduced elsewhere (44). On the other hand, the Adjustment Process Analysis Chart (or APA Chart), which derives from consideration both of clinical knowledge and animal adjustment experimentation, has been developed in some important respects beyond its original formulation as the dynamic crossroads (33) and needs further description. The main features are reproduced in Diagrams 12–1 and 12–2 (pp. 306, 318), which, however, contain other details, such as numbers, not to be explained until later.

These diagrams present essentially the possible history of any stimulated drive, consisting of a number of successive choice-points and paths joining them. The choice-points are, of course, seldom conscious decisions, and the term crossroads (or switch-points) is therefore better. This schema has the advantage, for clinical discussion and experimental design, that every conceivable learning or conflict situation can be unequivocally designated by a Greek letter indicating the pertinent crossroads situation, and a number indicating the particular attempt at adjustment which supervened. For example, $\gamma 3$ refers to one possible action of the ego to control a drive, after an attack on a barrier to the drive expression has been repulsed. Four characteristics of this stochastic process analysis need to be stressed.

1. The second half of the flow diagram (Diagram 12–2) from δ (delta) through Z (zeta) applies only to organisms, humans, and, perhaps, ages capable of developing some sort of ego structure and of internalizing conflict. Thus the whole diagram has generality of application to humans, but the story of conflict and learning nevertheless cannot be written in complete independence of the level of the organism, and only section 1, α (alpha) through γ (gamma) (Diagram

12–1) has the widest biological generality. In other words, we start with the possible fates of a drive, but as one of these fates is its development into an acquired sentiment system, the later alternatives deal with the fate of acquired sentiments and primary drives in conflict.

2. Only those channels are carried further which lead to increasing complications of response rather than to the response of simple satisfaction. This means that all channels which solve or terminate the drive satisfaction problem are carried no further, e.g., $\alpha 2$ (alpha), complete supercession by a stronger drive, externally stimulated, or $\beta 1$ (beta) pugnacity successfully breaking barrier. Of course, even in these cases, in the normal chain of events, the drive will re-charge itself, renewed satisfaction will be demanded, and a fresh history will have to be written. However, the important point is that the main prolonged channel thus becomes, necessarily, the history of prolonged frustration without any simple equilibrium of satisfaction.
3. In addition to the two main symbols in this model designating crossroad situations and response paths, it may be necessary to recognize a third abstraction, namely, a *state* in which the organism temporarily rests. Perhaps the scholastic, theological term limbo, a place of temporary confinement (without a hellish connotation) is the best available to designate this class, which covers "state of tension reduction," "state of continued deprivation" (persisting ergic tension), and "state of energy impoverishment"—and perhaps others yet to be recognized. These "limbos" are fed from a number of crossroads and, in turn, feed back to particular crossroads, that is, they are essentially designations of closed, reverberatory circuits.
4. The Adjustment Process Analysis (APA) Chart is not entirely one of repeated ramification at crossroads, but contains some convergences, by various experiences, to the same end. Through these and also the several reverberating circuits (in terms of networks, but also "vicious circles" of behavior to the clinician or teacher), in which there is a return to an earlier attempt at solution, the structure is a lattice rather than a tree. Incidentally, since most of these limbos, reverberation circuits, or feedbacks are obvious, and their drawing in would complicate and obscure the other features of the diagrams, they are often omitted. Notably, supercession of the given drive stimulation by stronger stimulation of another, as at $\alpha 2$, $\beta 3$, etc., is not carried back, for obviously such supplanting simply re-starts the whole scheme with a new drive. Also, it can be taken as a general rule that an additional path can always be drawn back from each crossroad, representing a tendency to ignore the whole present development of the situation and to return to earlier responses.

Incidentally, all such feedbacks may or may not have the character of a non-adjustive rigidity. They may be positively adjustive, since sometimes, in the interim, the environmental situation has become changed enough for an earlier response now to prove effective; for example, a person who has settled at $\gamma 6$ on a phantasy satisfaction before an unbreakable barrier may, on perceiving possible change in the situation, return to $\beta 1$, to a pugnacious attack on the barrier, which on this occasion may happen to break it. A periodic retesting of old barriers is, in fact, as easily conceivable as a non-rigidity of habit, as it is as a rigidity of biological drive.

5. The distinction between ego satisfactions, on the one hand, and all other satisfactions (of ergs and unorganized sentiments), on the other, must be kept in mind. The conflicts in the latter part of the process (Diagram 12–2) begining at the δ crossroads, are rendered possible at all only because an organized self-sentiment and ego has developed and because there are ego gains made at the moments when there are ergic losses. Consequently, though the prior α through γ schematization applies equally to the fates of an ergic or of an ego structure need, section 2 describes events from the standpoint, necessarily, of only one side. It does not much matter which side we record first, but since there is little to differentiate among the various ego gains, we choose the "losing" side. That is, we follow the various alternative processes which can occur for a rejected ergic need, for these are also of greater moment to the neurotic process. This, in fact, implies the total dynamic description, even though taken from only one referent. Incidentally, the fact that certain paths lead to the total dissatisfaction of an erg is dynamically, hedonically, possible on the assumption that (short of suicide or psychoticism) the controlling ego continues to get more satisfaction than is lost in that drive.

For the clinician, no enlargement or illustration on the essential resumé in Diagram 12–1 is necessary, for the terms have the usual meanings, and in fact, it does nothing but systematize, for later mathematical treatment, the dynamic lore with which the clinician operates daily. Also the theory that neurotic phenomena normally arise at certain points in this scheme of attempted adjustment, notably, in the Z crossroads, is fully familiar to him. In accepting this Adjustment Process Analysis (APA) Chart, it should be noted that we do not rest our conclusions uncritically on the particular elaborations of some existing clinical theories as to where and how neurotic phenomena arise. The weights to be given to particular influences remain to be determined, but we do accept the core descriptions of conflict, etc., which are experimentally confirmed.

Our plan is now to integrate, with mutual illumination, the observationally based APA or dynamic flow chart, on the one hand, and the new experimentally based findings on factor structure, together with the differences of factor levels between neurotics and normals, on the other. If a taxonomy of cultural situations were worked out empirically, and quantitatively, as it has worked out in principle and method (44), we would aim to embody that also. But this degree of particularity must be postponed. In any case, to proceed to exact quantitative statements in the APA Chart of the degree of personality change to be expected from following some particular dynamic adjustment would require not only a qualification of the particular taxonomic situation to which the adjustment is being made, but also would require the development of statistical methods for this calculation.

In the second development of theory (Chap. 13) we shall sketch the possibilities for this calculation, but in the remainder of the present chapter we propose to discuss the problem at a qualitative level, in terms of psychological understanding. Primarily, indeed, we shall ask ourselves, "What are the associations which hypothetically would be expected to arise between the experience of particular adjustment paths and the existence or development of certain personality traits (conceiving these traits now in terms of the established source traits measured in our experiments)?"

These associations will arise through both (a) persons of particular factor levels tending to choose (consciously or unconsciously) certain paths, and (b) the experience of certain paths creating, by learning in the broader sense, certain personality factor levels. Thus, the following sections develop a series of hypotheses and, ultimately, a theory, based on knowledge of the loadings of the personality factors in a great range of diverse psychological processes, as well as the behavior of the factors in relation to age, background, etc., regarding the associations.

Nature of the Systematic Path-Personality Associations Sought in Section 1 of the APA Chart: External Conflict

Before proceeding, it must be recognized that the attempt to reach a sufficiently finished theory at the present juncture in experimental findings is necessarily something of a *tour de force*. Seldom has a detective been asked to reconstruct the crime from such fragmentary evidence! Let us be clear as to what firm ground we have. On the one hand, we have the adjustment process, as seen by clinicial experience and animal learning experiment, now abstracted in the dynamic crossroads principles in the APA Chart. On the other, we have findings of significant differences in certain personality factors between neurotics and normals together with the all-too-fragmentary, though strategically widely positioned, initial results on the natural history of these factors. This gap might be too wide to bridge were it not for the numerous additional findings at somewhat lower significance levels, for example, age trends, heredity, occupations, physiological associations, which, together with lesser facts known to anyone steeped in this area of experiment, permit unexpected integrations.

Our purpose, then, is to develop hypotheses to explain the main facts (putting most weight on explaining the known neurotic-normal differences) in terms of the happenings in the APA (dynamic flow) Chart. The present section will handle crossroads α through γ, and the following, δ through Z. (The division is mainly to keep each within a reasonable space for discussion.) Initially, we shall deal with what could be general to any magnitude of conflict and any age at which conflict could occur, although, later, modifications due to varying these conditions will be discussed. It is understood, by reference to the APA Chart, that we are already dealing with any drive and any environmental barrier. Further, except in rare instances where a single experience will modify the whole personality, we are dealing with repeated response to a situation and the repetition in life of similar situations. For example, the "failure in school" situation is actually a long series of failure situations and a repetition of responses, which may not all be identical, but which predominate in one path for a given individual. In these experiences it is posited that the same pre-existing personality factors will favor certain modes of solution and that the repeated exposure to certain problems and certain solutions will favor the development of particular personality factors.

Although, as stated above, mathematical model and statistical considerations are relegated to the next chapter, one stochastic relationship must be explicitly recognized even here, namely, that since the number of paths from any one crossroad situation is limited, the frequency of a person's association with one path will be inversely related to his frequency score for traversing others. It will follow from this, in so far as any systematic relations of personality and paths exist, that, for example, the positive association of score on Factor A with frequency of traversing path αX will result (other things being equal) in a negative association between Factor A and path αY.

In general, our greatest attention must be given to what we shall call the critical paths in the flow chart—these are, at each crossroad, the one direct path to the following crossroads. With this, as with any other path, it will be evident that there will be a tendency for factors favoring any one of the four or more alternative paths to be unfavorable to this shift to the real crossroads. When we reach the point of inserting our conclusions on path-personality association in the chart as factor numbers entered alongside paths in the APA Chart, these indirect associations will be omitted from all paths (except occasionally the critical path) in order to simplify the diagram. In the final summary of the associations hypothesized with the critical path, however, we must be careful to include these secondary associations, if they seem substantial. For example, if there are three paths, 1, 2, and 3, among which 2 is the critical path and high intelligence definitely favors choice of path 1, but 2 seems, as far as a priori psychological analysis can indicate, to make no especial demands on intelligence, then 2 will actuarially tend to have some negative relation to intelligence. This will perhaps be worthy of record only if 3 also would be unlikely for persons of good intelligence and if the estimated negative correlations with paths 1 and 3 are considerable.

As we begin to discuss path-personality associations it will become evident that our earlier systematic studies on personality factor, nature-nurture ratios (36, 52, 72) come powerfully to our rescue in deciding otherwise insoluble questions of direction of causal action, for if a trait is hereditarily pre-determined it can only be a cause of choosing the path, not a learned consequence. However, one must be on guard against assuming that the hereditary traits necessarily operate early either in the life-history or in the crossroads sequences. For example, if there is an hereditary tendency to favor repression as a solution to conflict, this would operate quite late in the series of steps leading to neurosis; and, too, a moderate defect in hereditary intelligence may produce its frustrations late in life as exemplified, for instance, in the failure of a man who has been monetarily successful to obtain cultural satisfaction. Furthermore, it is not correct to argue that what is hereditary will produce path-personality associations entirely by causing the individual to choose a path, rather than through the experience of the path. For example, the outcome of repeated learning exposure to a path of failure, probably manifested in a shift toward lower Dominance and toward Subduedness, (U.I. 19—), may show itself more quickly in those endowed with a weaker constitution in U.I. 19. We are familiar in school education with the fact that levels in constitutional ability affect the end-level of any learning process, and the same greater and lesser susceptibility to experience will hold for constitutional gifts affecting personality learning. Conversely, it would be incorrect to argue that all the factors determining choice are constitutional. In the very first instance, they will tend to be so, but at the thousandth repetition, the constitutional influence might not be more than 1 per cent of the total personality traits causing this choice. In short, environmentally acquired factors as well as hereditary ones are determiners of choice.

With this reminder of special considerations applying to hereditary factors, let us now proceed to psychological inferences about personality factors expected to have associations with the various paths. Some consideration will be given to any of the twenty known objective test personality factors which seem likely to be associated, but principally to those shown empirically to be what we have called either neurotic process (focal) factors or neuroticism-contributing (less focal) factors. Our reasoning must necessarily draw upon a great deal of experimental work connecting particular psychological processes and modes of response with these factors, additional to the descriptions given in Chapters 5 and 10, and readily available elsewhere (44). Objective test factors (rather than questionnaire factors) will be emphasized in our discussion because they are at present the most comprehensive and concise way of representing available information on personality structure and process (see Chap. 6, p. 118). However, many of the hypotheses could be formulated as well, or almost as well, in questionnaire terms.

The α through γ crossroads cover essentially the story of frustration or satisfaction. They do so in relation to external barriers prior to, and not necessarily connected with, neurotic developments. This first section of the Adjustment Process Analysis (APA) Chart covers phenomena almost equally obvious in man and animals, except for the $\alpha 5$ path—in which a drive encounters an internal barrier—which applies far more frequently to developed human organisms. Only organisms capable of substantial control in terms of remoter goals, represented in man by the ego, can proceed to the subsequent conflicts of Section 2 of the APA, namely, the δ (delta) through Z (zeta) crossroads. (Indeed, in a treatment strictly confined to the first stages of adjustment, even $\alpha 5$ would not appear at all. It is maintained in the chart for comprehensiveness, reminding us, in the case of an organism with prior experience, that the whole process should be referred onward to later strictly human crossroads; that is, it makes the APA Chart adapted to all cases from the beginning.)

Since the δ through Z adjustments, by contrast with Section 1 of the APA Chart, apply only to organisms capable of inhibiting behavior by internal cues (ideas, conscious memories, ego and superego and other sentiment structures), we have a situation where the arousal of the drive more or less immediately triggers its own inhibiting forces. There need be no delay through stimulus situation-avoidance being initiated by new, threatening (real or symbolic) elements appearing in the concrete situation itself. In the fullest sense of neurotic, as expressed in our study by neurotic humans, no true neuroticism can appear at all in Section 1 (α through γ) or, indeed, before the ϵ (epsilon) crossroads, though some prior adjustments in the $\alpha - \gamma$ crossroads will be more predisposing than others to subsequent neurosis. This predisposing to later developments is important for our further arguments. It means that, by the nature of the stochastic process, this choice and its personality associations will become statistically tied with neurosis, though not organically connected with the true neurotic process. Several of our neuroticism-contributory factors, low intelligence, for example, might be expected to operate at this stage.

With this description of the two main sections of the Adjustment Process Analysis (APA) Chart, let us now start with an organism standing at the α crossroads. The five responses, $\alpha 1$ through $\alpha 5$, represent, according to the plan of chart construction, the only possible sequels to the α situation, so that, in terms of subsequent calculations, whatever favors solution by one path will reduce (by one-fourth, other things being equal) the likelihood of following each of the other four. Usually, in the possible paths, only one leads on to the next crossroads ($\alpha 3$, in this case) and this we have called the critical or involving response path, for all others solve the situation in some way and lead to quiescence or to some reverberatory limbo beyond which it is not necessary to move. Those attempted adjustments which actually lead to satisfaction—however pleasant this may be for the organism—are of no further interest to the psychologist, for they produce no further conflict or structural development and pass out of the field of theoretical interest.

The classes of cause which could lead to statistically demonstrable associations between the frequency of experiencing certain response solutions and any other variables, which we have stated above to be essentially two (choice and learning), are, in further subdivision, five as follows: (a) we must now add, for completeness, the influence of variables quite external to the organism, in determining the choice (This assumes that even when we have defined the choice as one between breaking a barrier *vs.* accepting it this situation has its environmental stimulus dimensions, which would enter into any prediction of the choice and of its personality consequences or associations); (b) directing of choice (conscious or unconscious) or innate temperamental, dynamic, and ability levels of the organism; (c) similar determination, but by acquired characteristics of the organism due to earlier learning experiences in the APA Chart paths; (d) association of path frequencies with the personality characteristics which repeated experience of these paths produces; and (e) association of both frequencies with innate traits which favor speed of particular learning in certain paths.

Viewed from another angle, causes (b), (c), and (e) in the paragraph above are determining conditions in the organism, while (a) and (d) represent determining conditions in the environment. However, (a) may eventually be represented also by changes observable in the final organism—and not only changes due to environmental determination of these path experiences; for example, an environmental iodine deficiency causing lower intelligence would produce more experiences of following the less intelligent path, but would also be evident in the usual stigmata of cretinism.

Let us now proceed through Section 1 of the APA Chart, examining, psychologically, the personality factors which would be expected to become associated, from the above causes, with the critical paths eading toward neuroticism. For this purpose we shall give only secondary attention to description of the environmental influences themselves which operate to produce the personality factors.

Personality associations of responses at the α crossroads: stimulated, unsatisfied drive. A person accustomed to logical analysis of basic assumptions, beginning with classes (a) and (b) of connections above, might well argue that standing at α is the first cause of neurosis. Like a Buddhist, he may insist that, by the very evil of being alive and stimulable, a man is "born to trouble as the sparks fly upward"—neurosis being one ultimate, possible trouble. However, logically and in statistical analysis, we set aside being alive as a quality taken for granted and not correlatable with individual difference, because it is common to all referents. The more defensible relationship to which this comment on the nature of drive itself calls attention is that there might be in the organism some specific quality variant of drive having significant association with greater proneness to encounter barriers or lesser likelihood of responding adaptively to them when met.

Freud found such an intrinsic quality in the "psychosexual disposition" and "instinctual regression" concepts. By reason of these, the goals that are inherently satisfying to the drive become in the case of the potential neurotic so predominantly sexual (from constitutional deviation) and so "polymorphously perverse" (from regression) that the chances of encountering barriers are greatly increased. This likelihood of lesser satisfaction resides, incidentally, both in the cultural restrictions and also in the very nature of the cosmos (especially with biological nature). When all causes of neurosis typically described in psychoanalytic theory are examined with a statistician's eye, from the standpoint of relative statistical contribution to the variance of neurosis, one arrives at a rough estimate that the tendency to regression is likely to be not only the first but also the most powerful cause. However, again the practitioner's evaluation may be a slanted one because, therapeutically, more thought must be given to the later and more remediable complications.

Our experiments do not permit unequivocal identification of the psychoanalytic concept of regression with any of our factors. This is because our experiments have thus far lacked variables which clearly, behaviorally, represent this psychoanalytic concept. Future experimental work would do well to examine not one but several possible claimants, notably U.I. 21—, Lack of Exuberance; 22—, Pathemia; 23—, Regression; 29—, Low Adaptation Energy; and 34+, Autia. All happen to have significant statistical association with neuroticism, but most, except U.I. 23—, and possibly 34+, are more readily explained in terms other than regression. Thus U.I. 21— is better explained simply as lack of instinctual energy, a constitutional endowment which, anyway, declines in strength from infancy onwards. U.I. 22— is regression in the sense of a retreat from clear, cognitive interest in, and objective handling of, problems in favor of a muddled emotionality of response; but it is not regression of instinctual goals and interests in the psychoanalytic sense. U.I. 23—, 29—, and 34+ all have qualities suggesting ergic regression in the sense of withdrawal of interest from external to internal satisfactions and adjustments. For example, the rigidity, low dynamic momentum, and small responsiveness of 23— and 29—, as well as the form of the curve of maturation of U.I. 23+ (having a form akin to the biological curve of intelligence), suggests that the latter, at least, has claims to being some kind of ergic maturational process which, through some influences, may fail. However, beyond these there exists a second-order factor, F(T)VI+ (Table 5–2), loaded in U.I. 34+, 29— and other compatible factors, which has claim to being Narcistic Regression—narcistic because it involves the narcistic primary, U.I. 26+ or Narcistic Self-Will. The suggested choice for a pattern of regression is one for further research with the alternatives U.I. 23— and F(T)VI. For example, experiment should investigate the scores on these two measures of schizophrenics and of individuals exposed to experimental conflict situations to see if the effects are greater on those initially deviant in one or the other of these factors. Meanwhile, our etiological theory recognizes that U.I. 23— and F(T)VI+ show statistical association with neurosis or sociopathy, and, further, it recognizes that they should do so in the role of predisposing causes.

There is yet another variation in drive quality that should theoretically be associated with incidence of neurosis. This is the quality of ardor, or exuberance, or ergic strength represented in Exuberance (U.I. 21) and in the second-order factor F(T)III+, which would both multiply contact with barriers (as an exuberant child encounters more trouble than a less energetic one), and also make the restraints of an already encountered barrier less tolerable. It is a curious fact that personality primaries with relatively high hereditary determination, U.I. 1, 19, 20, and 21, come together in this single second-order factor, F(T)III+ (Table 5–2), which we have called Temperamental Ardor which seems to summarize the chief, innate conditions in the individual which might be expected to cause him to encounter more barriers and o have greater difficulty in adjusting, by sublimation, to their existence.[1]

Regardless of the causes of the discovered second-order factor structure or even regardless of its existence, one can see that a certain collection of primary factor qualities in the individual, notably the innate qualities of low Intelligence (U.I. 1−), and low Exuberance (U.I. 21−), as well as some important acquired personality qualities such as Premsia (U.I. 16−), Pathemia (U.I. 22−), Ergic Regression (U.I. 23−) and Promethean Will (U.I. 19+), would lead one to follow paths $\alpha 3$ and $\alpha 4$ rather than gain satisfaction by path $\alpha 1$. For the moment we shall not take space to expand on the reasons for their contributing to failure to solve goal-seeking problems. The reasons are largely self-evident from the nature of these factors as discussed in Chapter 5 and shown in the various modes of experimental response demonstrated to be correlated with them. However, it should also be noted that later on, at $\beta 1$, and 2, high Exuberance may also lead to more resourcefulness in getting around barriers once encountered. This should lead to a *reduction* of choice of the neurotic path, $\beta 4$, though probably an increase in delinquent and sociopathic behavior, especially at $\beta 1$.

Parenthetically, even at this first step—the tendency to experience more situations as barriers—we are already considering acquired, learned factors as determining choices. As stated in describing the Adjustment Process Analysis (APA) Chart, the chart is an account of repeated experiences. Consequently, in all but the very first experience we ought, in α, to deal not only with what is innate but, additionally, with the second class of causes above—personality traits such as U.I. 16 and 22, which decide choice but are themselves the product of earlier path experience. Most important in this respect, at the α crossroads, is path $\alpha 5$, producing loss of satisfaction because of internal barriers. This, as pointed out above, at once transports the whole discussion to Section 2 of the APA Chart (Diagram 12–2) and the justification for

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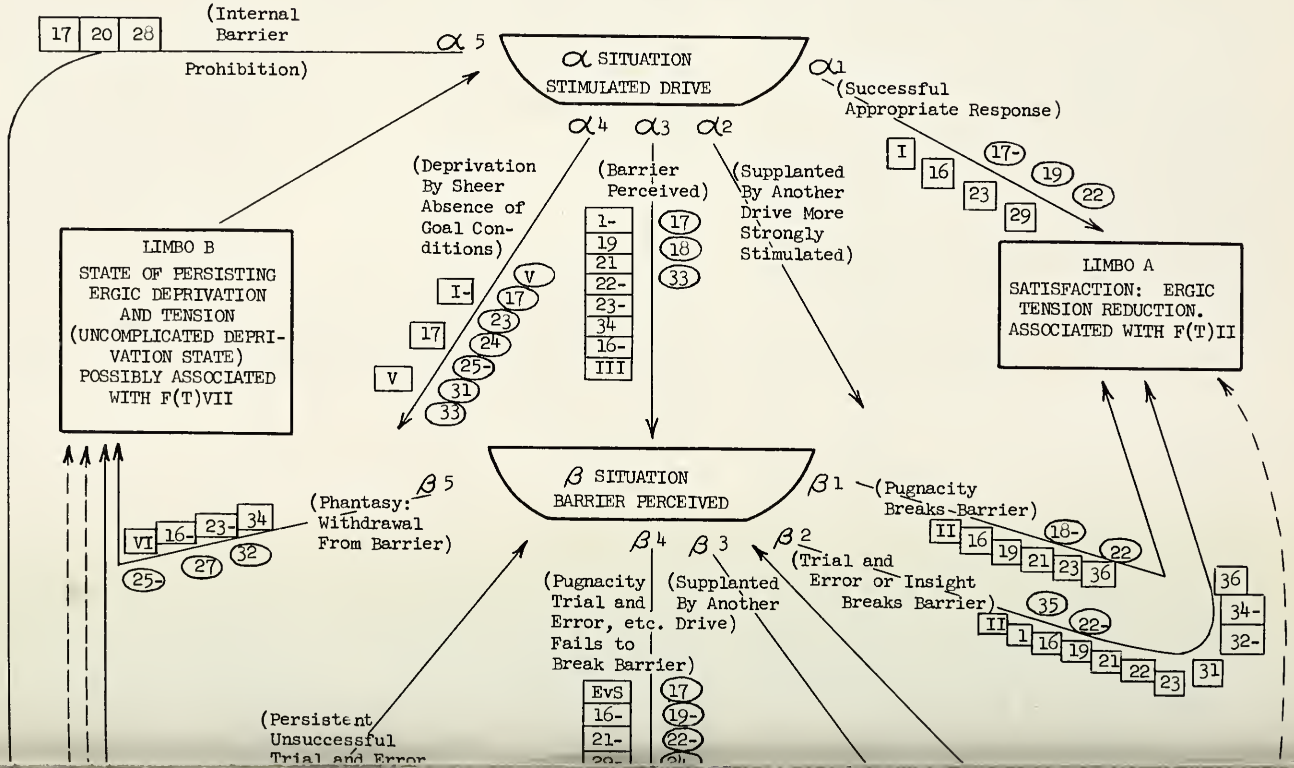
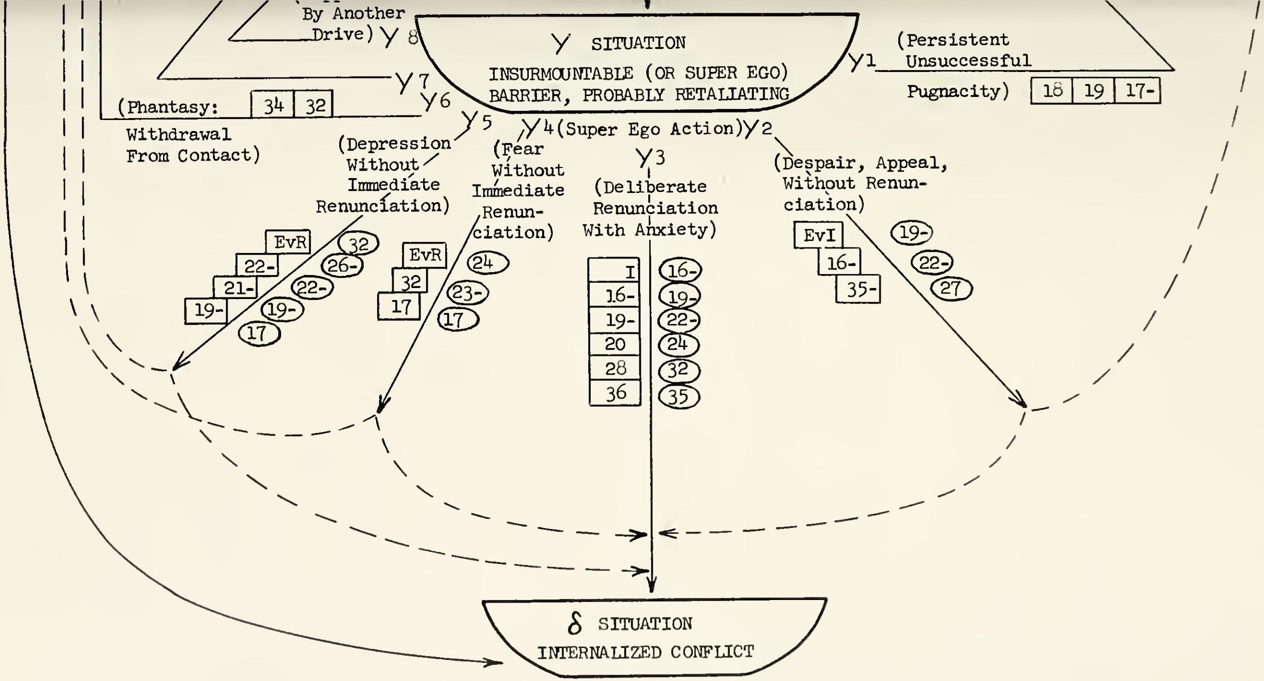
[1] Here and elsewhere, it must be remembered that primaries loaded in a second-order factor, offer, by reason of that loading, evidence of being either causes or consequences of whatever that factor essentially is. But, in our view, it is generally far more likely that they are consequences. In this case, if we were alternatively to hypothesize that F(T)III+ is Frustration by Barriers, we are, accordingly, compelled to take the statistically, formally less probable explanation that a set of causes of a common consequence have become bound in a factor. If we take the statistically more likely hypothesis that F(T)III is a single cause—a genetic, temperamental, and ability make-up favoring frustration by barriers—we are forced to the genetically less likely explanation that certain genes show very high genetic linkage and, moreover, act together in a powerfully pleiotropic fashion. Such genes, in fact, would need simultaneously to produce more exuberant drive, lower intelligence, etc., all favoring difficulty in sublimation. There are thus undeniable difficulties in either explanation of the fact presented by the second-order factor.

DIAGRAM 12-1

Adjustment Process Analysis (A.P.A.) Chart, Section 1: Personality Associations and Effects of Experience, Formulated for the α through γ (Pre-Internalized Conflict) Dynamic Crossroads.*


17 20 28
(Internal Barrier Prohibition)
α 5
α SITUATION
STIMULATED DRIVE
α1 (Successful Appropriate Response)
I 16 23 29
17- 19 22
LIMBO A
SATISFACTION: ERGIC TENSION REDUCTION. ASSOCIATED WITH F(T)II
α4 α3 α2
(Deprivation By Sheer Absence of Goal Conditions)
I- 17 V
V 17 23 24 25- 31 33
(Barrier Perceived)
1- 19 21 22- 23- 34 16- III
17 18 33
(Supplanted By Another Drive More Strongly Stimulated)
LIMBO B
STATE OF PERSISTING ERGIC DEPRIVATION AND TENSION (UNCOMPLICATED DEPRIVATION STATE) POSSIBLY ASSOCIATED WITH F(T)VII
β SITUATION
BARRIER PERCEIVED
β 5
(Phantasy: Withdrawal From Barrier)
VI 16- 23- 34
25- 27 32
β1 (Pugnacity Breaks Barrier)
II 16 19 21 23 36
18- 22
β2 (Trial and Error or Insight Breaks Barrier)
II 1 16 19 21 22 23
35 22-
31
36 34- 32-
β4 β3
(Pugnacity Trial and Error, etc. Fails to Break Barrier)
EvS 16- 21-
17 19- 22-
(Supplanted By Another Drive)
(Persistent Unsuccessful Trial and Error


By Another Drive) γ 8
γ SITUATION
INSURMOUNTABLE (OR SUPER EGO) BARRIER, PROBABLY RETALIATING
γ1 (Persistent Unsuccessful Pugnacity)
18 19 17-
γ 7
(Phantasy: Withdrawal From Contact)
34 32
γ6
γ5 (Depression Without Immediate Renunciation)
γ4 (Super Ego Action) γ2
(Fear Without Immediate Renunciation)
γ3 (Deliberate Renunciation With Anxiety)
(Despair, Appeal, Without Renunciation)
EvR 22- 21- 19-
32 26- 22- 19- 17
EvR 32 17
24 23- 17
I 16- 19- 20 28 36
16- 19- 22- 24 32 35
EvI 16- 35-
19- 22- 27
δ SITUATION
INTERNALIZED CONFLICT

Continued on Diagram 12-2

*The general meaning and characteristics of the diagram are described in the text, p. 295 ff. As for the identification of operating influences and effects: (a) first-order objective test factors are represented by the Arabic numerals of their Universal Index numbers (45, and Chapter 3), (b) second-order objective test factors are represented by the Roman numerals used to identify them elsewhere in this text (see Chapter 5), and (c) environmental influences are represented by the letters "Ev" followed by another letter to indicate the type of influence, as described in the text.

Square enclosures of the above symbols indicate a hypothesis that they operate as causes; circular enclosures indicate a hypothesis that they occur as effects. Absence of sign means that they are operating at their positive poles, while a negative sign means they are operating at their negative poles, as understood from the content of the diagram.

The text and the diagram attempt to list only the most likely identifications of causes and effects, but neither can claim to enumerate all possibilities.

writing in U.I. 17 and U.I. 20 as personality characteristics favoring this path will be left to that section.

Since, as stated above, the APA Chart is intended to summarize associations exhaustively, it must cover not only personality causes but also environmental causes disposing to each choice of paths. The environmental causes, in general, will be describable as unusual levels in certain dimensions of the situation, for example the drive stimulation may be unusually prolonged, or the barrier unusually threatening. In Diagrams 12–1 and 12–2 we have introduced the symbolism of representing environmental influences by letters, always preceded by "Ev." for Environment. Also we have separated causes of a choice (personal or environmental) from consequences, by displaying the former in squares and the latter in circles. A complete and systematic cataloguing and quantitative treatment of environmental causes is not essential to this introductory treatment, and we shall handle them only illustratively. Obviously, the environmental influences of greatest importance will vary with the age, life stage, and cultural setting of the subject. Right at the α crossroads, for example, more barriers would be encountered, in childhood, by an individual facing stricter parental discipline or more sibling rivalry (represented by *Ev.,* for *environment,* and PD for *parental discipline* in Diagram 12–1) or, in adult life, by poverty (economic barriers, Ev. E) or a physique and presence unattractive to the opposite sex (Ev. US).

The psychological consequences of being compelled with greater frequency to follow various alternative crossroad paths cannot be so confidently evaluated as the causes, in the current absence of controlled learning experiments with factor measures; and, in any case, there would be differences acording to whether the deprivation, etc., applies to a drive, a sentiment, or an acquired ego structure. However, experimental work and clinical observation would lead one to conclude that deprivation, as at $\alpha3$ and $\alpha4$, can be expected to generate Anxiety (U.I. 24), through the Q_4 or Ergic Tension component, and one might expect also increased Imaginative Tension, U.I. 25−, and Dourness, U.I. 33+. Again, one can point to a second-order factor, F(T)VII, showing parts of this combination (with lesser loading in additional factors), and in this instance there is no difficulty in understanding such a pattern of co-varying primaries expressing ergic tension as a consequence of a single influence, namely, repeated experience of the path $\alpha4$, to deprivation. (This includes also $\beta5$ through $\alpha3$, and $\gamma6$, through $\beta4$ and $\beta5$.) The state of limbo indicated at the upper left of Diagram 12–1, expressing continuing ergic tension, is best representable in factor terms by U.I. 24, Anxiety, the phantasy expression of 25−, and 33+ and possibly 18+ as a shrewdness reaction to deprivation as constituting the exact mold for generating the discovered second-order factor F(T)VII.

We are not much concerned in this total diagram with the causes of differential frequencies as between $\alpha 3$ and $\alpha 4$, since the latter leads in a circle back to the same situation of having in the end to face a barrier. However, since traditional discussion is always about frustration by barriers and aggression against barriers, it may be necessary to reiterate that the APA Chart recognizes a distinction between deprivation and frustration, and that the explicit perceptual or conceptual recognition of a barrier is regarded as the starting point of an entirely new direction of behavior—pugnacity to break the barrier or intelligent behavior to by-pass it—not present when there is sheer deprivation of satisfaction without either explicit recognition of the goal or perception of any positive barrier to reaching it.

The prevalence of this deprivation type of behavior situation—$\alpha 4$ in the APA Chart—is not sufficiently recognized, but may be illustrated by the loss of a parent by death, the sexual life of a Robinson Crusoe, or, in the less sophisticated adult in our modern inflationary economic system, by what Chesterton called "that funny cash which makes men poorer still." [2]

Perceiving a barrier in its true light and orienting oneself to it is clinically often considered a salutary step toward adjustment; but, if so, it is only because it ultimately enables the person more intelligently to overcome it, or consciously to decide to control himself, or deliberately to find substitute satisfactions. For the immediate effect is no gain in satisfaction but only the production of a more crystallized frustration, and the possibility of complicating the situation by the sequelae of anger and aggression. These courses are indicated ($\beta 1$, $\gamma 3$, and $\delta 1$, respectively) in our flow chart, and the admitted salutariness of $\alpha 3$ compared to $\alpha 4$ (which merely postpones possible solutions) is no denial that even after recognition of a barrier, at $\alpha 3$, the solutions still remain to be found.

PERSONALITY ASSOCIATIONS OF REPEATED CONFLICT IN APAC SECTION 1: THE β AND γ CROSSROADS. The symbolism used in the APA Chart has already been described. As we proceed to illustrate its capacity to condense and summarize a great deal, which would normally be said at much greater length in discussions on adjustment, it will be perceived that its advantage goes beyond economical description and could include also the means of calculation. Thus, it would be possible to attach to the present symbols certain indices for the degree or weight attached to the connection. The nature of these weights, whether differences of means between those who do and do not follow certain paths, or biserial regression coefficients, can be left to later discussion.

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[2] That is, a rising wage with attendant, unperceived inflation.

A problem which arises in an introductory, illustrative use of the APA Chart (parametric or non-parametric) is, as mentioned earlier, that slight positive associations of a certain psychological quality with paths $\alpha 1$, 2, 3, and 5 imply a substantial negative association with $\alpha 4$. In any systematic calculation by the APA Chart, all factors would have indices of association with all paths, which would take account of these necessary relations, and no problem would arise. But when we choose only a few outstandingly clear psychological associations to talk about, these secondary, necessary connections are not included. We have adopted the compromise, as stated earlier, of recording these associations, which are not psychologically self-evident only in the case of the critical paths which lead to the final neurotic state for which our figures are available.

Considering now the effects ot inherent personality qualities at the β crossroads, it is evident that greater aggressiveness (U.I. 16+ as ego activity, and U.I. 19+ as temperamental unsubduedness) will lead to more assaults on the barrier. Conversely, existing tendencies to greater withdrawal, through Regression, U.I. 23−, Autia, U.I. 34+, and Introversion, U.I. 32+ (where social barriers are concerned), will reduce the frequency of such outer solution's ($\beta 1$ and $\beta 2$) and favor, at least with Autia, U.I. 34+, the phantasy path $\beta 5$. Intelligence will again enter, at $\beta 2$. In so far as $\beta 2$ may be achieved, by a physical or mental trial-and-error solution, U.I. 21+, Exuberance, should aid solution and so also should the reality thinking of U.I. 22+, as against retreat to Pathemic emotional repetitiveness, U.I. 22−. Both Regression (with poor Ego Mobilization), U.I. 23−, and Autia, U.I. 34+, should incline to accepting phantasy solutions, $\beta 5$. The environmental causes which favor barriers remaining unbreakable are partly the same as those which multiply barriers at the α crossroads, but might include, further, harsh or authoritarian school atmospheres, presence of larger siblings, parents who mean what they say and, in adult societies, firm laws, economic stringencies, cultural pressure. (All are represented as Ev. S, in Diagram 12–1.)

Once again, conclusions must be considered speculative when we attempt to define those personality associations which arise from learning on paths (or in other consequences). Indeed, most of the experimentally available and known correlations of barrier behavior with individual factors cover choice behavior rather more than learning behavior. However, one can safely conclude that the immediate consequences of recognizing that a barrier is insurmountable, as at $\beta 4$, are probably quantitatively far less than those of prolonged experience of the unbreakable barrier, at the crossroads, though of the same nature. Thus Resignation-Subduedness (U.I. 19−) is surely the most expected consequence of repeated recognition of insuperable barriers, but there is also perhaps increased Inhibition (U.I. 17+), Introversion (U.I. 32+), Imaginative Tension (U.I. 25−), and certainly Anxiety (U.I. 24). Since most of these achieve fullest expression under $\gamma3$, they are discussed there.

At the γ crossroads, the struggle typically ensues to avoid the critical path $\gamma3$, meaning final (or would-be final) renunciation of the drive. Path $\gamma1$ is simply a return to aggression, as $\gamma7$ is a return to attempts at circumvention, and $\gamma6$ a deeper involvement in the phantasy solution tentatively tried at $\beta5$. The new responses are: one, $\gamma2$–Appeal (despair and weeping), which we suspect, from inspection, of factor loadings (66), is associated with high U.I. 35− endowment; two, simple depression and immobilization at $\gamma5$, and, three, fear and avoidance of the barrier at $\gamma4$, especially in so far as it is human and retaliates when attacked. Without that taxonomy of situations, the need of which we have already discussed, no one knows what percentage of barriers are of the retaliating type, but it is probably so high as to be almost typical. The $\gamma3$ and $\gamma4$ responses will rise greatly in frequency with retaliating barriers.

The γ crossroad sequelae tend to be temporary vacillations without any new or satisfactory ultimate end. Only $\gamma3$—agreement finally to renounce the drive—offers a real change from the conflict which has been variously disturbing up to that point. Lengthy—but fascinating—discussion would be possible as to precisely how the various personality factors would operate in favoring this path or militating against it. Somewhat more speculatively, one could explore the personality factors likely to be changed by powerful and habitual experience of this path. But space compels us to restrict ourselves to the merest illustration, leaving the index numbers inserted in Diagram 12–1 to state the spectrum hypothesized, and leaving the psychologist to exercise his own knowledge of the factors in judging the convincingness of the hypothesis. In fact, this practice must be followed throughout the statement of hypotheses on the APA Chart, for an immense range of clinical implications has been condensed in a brief formulation.

But it can be seen that the five personality factors with the greatest likelihood of being influential in the choice of the renunciation path are Premsia, U.I. 16−, by reason of its overprotected dependence on authority; still more, Resignation or Subduedness, U.I. 19−, with its temperamental absence of the Promethean spirit; Comention, U.I. 20+, which should enter powerfully in that much renunciation is in the interests of cultural conformity; strong Rigid Superego, U.I. 28, for obvious reasons, and U.I. 36, more moderately, because regard for a developed self-concept often requires renunciation. The consequences of the renunciation path may be the strengthening of some of these, e.g., U.I. 19−, and also increased Introversion, U.I. 32+, increased long-circuiting of behavior, U.I. 35+, and even at this stage, some increase of fear (through retaliation) and Anxiety through undischarged drive, U.I. 24. If we are right in interpreting U.I. 16+ as an aspect of the ego strength of F(T)II+ (Table 5–2), gained by successful independence in emotional and general life problem-solving, possibly some reduction in this factor occurs from the final admission of failure to gain expression.

At this point, if we survey the particular collections of primaries positively associated with certain major paths—in fact the main critical paths—it is noticeable that some of them have considerable resemblance to the second-order factors (Table 5–2) found empirically among primaries. For example, $\alpha 4$, when the negatives of other co-paths are entered, has the associates 17+, 23+, 31+, 25−, etc., of F(T)V, History of Restraining Environment, and $\gamma 3$ has several factors 20+, 28+, 35+ in the Tied Socialization second-order factor F(T)I+.

Whether the superego action of F(T)I introduces itself at $\gamma 3$, or should really be considered a later, δ crossroads phenomenon, tied to virtually all δ crossroad responses, is almost a matter of hair-splitting. However, a reminder that additional forces from internal barriers favor $\gamma 3$ is given by introducing, at that point, a note, *ex machina,* in Diagram 12–1—"Superego Action." This reminder is a desirable and necessary feature of the chart, because from δ onwards the chart ceases to deal with the fate of one drive only, but begins to deal with two—the drive on the one hand and the ego-superego structure (or whatever else we might call the main organized needs of the organism) on the other. The paths of change now deal not only with the fate of the dissident drive, but also the fate of the organized total dynamic structure—for example, its impoverishment by locking up forces in permanent conflict. The full discussion of these outcomes belongs to δ, but already in the critical path $\gamma 3$ this particular solution is being aided by a strong superego. And since we are far from certain that the whole superego structure concept is covered by the discovery of the F(T)I factor patterns, we have added "Superego Action."

Although these inner determiners begin to become very important at $\gamma 3$, environmental differences still powerfully affect the choice frequencies. Notably an indulgent, overprotective, or even simply affectionate family atmosphere (Ev.I) could strongly favor $\gamma 2$ responses. The violence of retaliation by the attacked barrier, e.g., lack of forbearance, more powerful siblings, feared father (Ev.R), would favor $\gamma 4$ response, and so on.

In a last retrospect over the APA Chart in Diagram 12–1, we must conclude that detailed hypotheses about associations with paths must be stated in terms of primary factors. At the same time it seems that certain broad generalizations about success in proceeding or not proceeding beyond certain crossroads or into certain limbos can be stated, as the clinician has always been inclined to state them, in terms of what we now recognize to be broader dimensions, the second-order factors. The apparent instances of second-order association are F(T)II+, Expansive or strong ego, in the $\beta1$ path, but also in what is common to all three paths—$\alpha1$, $\beta1$, and $\beta2$—that end in the limbo of drive reduction; F(T)I+, Tied-Socialization, at $\gamma3$; and, less clearly, F(T)VI+ at or after $\beta5$.

The α through γ crossroads should not be left without discussion of the role of low intelligence as a neuroticism-contributing factor. For it is at the α and β crossroads that psychological reasons for expecting a correlation are most clear. If poor problem-solving (for cognitive material and the cognitive aspects of gaining emotional satisfactions) increases the chances of getting into a situation (the γ and δ crossroads) from which neurosis can develop, there should arise an appreciable negative correlation between neuroticism and intelligence. Such a connection of cognitive ability factors with a field sacred to dynamic explanations is strenuously denied by some writers, as well as by those intellectuals who wish to claim neurosis as the pathetic privilege of the intelligentsia! Volumes have been written, and many surveys published, on the relation of neurosis to intelligence, with conflicting final conclusions. So much conflict is not surprising when one reflects that the main issue, theoretically and experimentally, turns on getting true samples of both the normal and the neurotic populations. No amount of careful sampling among patients in the early days of psychotherapy—when visiting a psychoanalyst was a luxury for persons of middle- and upper-class incomes and cultural levels—could avoid leading to the conclusion that there exists a positive relation of intelligence and neurosis. Later samples, from welfare states where public clinics extended the privileges of neurosis to all, cast doubt on the complaint of the intelligentsia that "but to think is to be full of sorrows and leaden-eyed despairs." Finally, the realistic mass sampling of draftees that was made in World War II seemed to show, if anything, that there were higher psychiatric rejection rates at the lower socio-economic levels.

Obviously, the association of neurosis with low intelligence would not be expected by our theory to be a substantial one, and it should vary sensitively with sampling. Consequently, it does not surprise us that in our own data the association is more emphatic in the smaller objective test group (Table 5–1) than the larger 16 P.F. group (Table

4–2). Indeed, a closer theoretical examination of the relation of ergic frustration to intelligence suggests that the primary linear correlation between intelligence and ability to gain ergic satisfactions would, secondarily, have imposed upon it a curvilinear relation with a rise of neurosis at the intelligence extremes. For, it is also true that our society, aided by mass communication, is best adjusted to the emotional needs of the average person, and both extremes of intelligence are frustrated. But whereas the upper extreme is most frustrated in its tastes, the lower is likely to be frustrated in its very appetites. A monotonic curve of decrease of neurosis with intelligence, becoming practically flat in the higher ranges, is the most likely final resultant of the two influences discussed, and an overall negative correlation should result, expressing primarily this more basic inability of the less intelligent to gain ergic satisfactions (directly and in cultural sublimations). Parenthetically, when psychiatrists speak of the more intelligent "solving their emotional problems at an intellectual level," the implication is that through some evasion they do not solve them basically. But this sense is not the same as our reference to their "solving their external problems." For even the intellectual expression of a conflict, which is so gross that the need for a real, emotional solution would otherwise be imperative, still provides some measure of avoidance of severe ergic tension.

Personality and Environmental Associations of Internal Conflict: APA Chart Section 2: the δ through Z Crossroads (Diagram 12–2)

It will be noted that when the psychiatrist writes on the etiology of neurosis, he is, commonly, largely preoccupied with the happenings in the δ (delta) through Z (zeta) crossroads. He thus neglects those earlier happenings which, as we have seen, are likely to have distinct, statistical association with later neurosis, even though the neurotic end-state does not follow from them as a necessary condition. Also we should note, as relevant to theoretical comparisons, that much of the ingenious experiment attempting to produce neuroses or other neurotic-like behavior in animals by Liddell (137, 138), Mowrer (162), Hunt (121), Masserman (150, 151), and others has succeeded largely in simulating experimentally the α through γ situations and, only to a limited degree, the present δ through Z crossroads. This accounts for the failure of that close connection between the clinical theory and animal experimentation concepts which had been hoped for originally. Internal inhibitions may be built into the animal by punishment, but the enormous difference in scale between these limited prohibitions and the ego and superego restraints, which the vastly more developed human mind can acquire, makes the results on internal conflict scarcely comparable. The possibility now approaching, that of measuring ego and superego development differences in humans with accuracy, should lead to renewed experimental work on neurosis in human subjects, with those relatively slight, experimental manipulations which can be tolerated.

However, in either animals or humans, we should note that even when the organism is pushed so far along that it is actually making choices at the δ crossroads between ergic satisfactions and the alternative satisfaction of fully internalized inhibitory needs (sentiments in man), neurosis is not the inevitable journey's end. Yet, because we are closer to the true neurotic end-paths, the personality associations we now find, in these final choice and experience paths, should, theoretically, be more highly statistically discriminating between neurotics and non-neurotics than any found in the first part of the APA Chart.

Methodologically, we are now in a more difficult area, for as conflict becomes more internalized the identification of personality factors at work becomes more a matter of clinical inference and less one of resort to loading tables showing which behavior is associated with particular factors. Nevertheless, many of the objective test situations available in the history of our experiments do permit inferences about repressive action, superego action, etc.; and the real difficulty remaining is that of inferring how factor levels are, conversely, affected by experience of repression, conflict, etc. It becomes increasingly urgent here to have a population sample measured on the factors before and after paths have been followed, so that connections can be inferred where they cannot be seen from inspection of the factor loadings available at present.

It will be recalled that through Section 1 of the APA Chart, crossroads $\alpha - \gamma$, our concern has been largely with individual personality and environmental differences in the frequency of encountering problems, feeling them intensely, avoiding them, and, especially, solving them when unavoidable. Now, in Section 2 (Diagram 12–2), the emphasis turns to differences that arise in mode of adjustment to insoluble problems, i.e., to reacting to ergic needs which must be considered permanently unsatisfiable. First of the possible responses is a purely rational, conscious recognition of the situation and deliberate control (suppression, not repression) of the unsatisfiable erg, depicted by path $\delta 5$. This response, which one can expect to be aided by personality endowment in the ego strength of U.I. 16, the stronger Self-Sentiment development of U.I. 36, and probably U.I. 22+, 23+, and 34−, will avoid neurosis, but return the individual still to the limbo of persisting ergic tension (Limbo B). Resort to control may be expected to develop Mobilization level, U.I. 23+ and increase Long-Circuiting, U.I. 35.

Sublimation, at δ2, will again give a role to good intelligence, in avoiding neurosis, since cultural subliminations are more available to the intelligent, and may increase the ideational tension of U.I. 25—, etc. Capacity to mobilize ergic resources for external object attachment and action rather than for regression, in U.I. 23+, may, if our general conception of its nature is correct, also assist. The chief sequel on the critical path, δ3, will be the generation of anxiety,[3] prior to the attempted *pis-aller* of repression, while the pre-existence of a higher level of anxiety in the personality will also be a cause for choosing this path. However, stronger Comention, U.I. 20+, and stronger Superego development, U.I. 28+, will obviously also contribute to an individual's choice of this path. Except for a brief discussion in Chapter 5, little has been said to justify the central roles we are hypothesizing here for U.I. 20 and U.I. 28. The latter is easily understood, because it seems to fit the psychoanalytic concept of the superego or, at least, a major, early childhood, rigid component therein and has a high environmental determination as might be expected. But Comention is a less self-evident pattern, about which we know too little to interpret completely.

Comention is largely a tendency to conform to good social standards and could possibly be distinguished from U.I. 28 by having more emphasis on group belonging than on unconscious superego standards. (Shame instead of guilt?) It appears in many ways a happy tendency to adopt cultural standards willingly, to accept authority, and to be one with society, though it is sober, not gay. It relates positively to good performance in school and job. There is a curious similarity in many actual test expressions to Anxiety as an objective test factor. It is, indeed, factorially cooperative in the above test-sharing sense with both Superego (U.I. 28) and Anxiety (U.I. 24), though the U.I. 20+ individual does not report anxiety, and psychiatric evaluations place him as unusually free from anxiety. Comention might be considered simply "exposure to good family and school behavioral standards," involving satisfaction in renunciation from an early age; but this explanation fails to fit the substantial hereditary determination. A few signs, notably, some slight correlation with Desurgency (44, p. 326), and loadings in such experimental measures as the tendency to forget ideas that are conflicting, suggest that we are dealing with a constitutional capacity to inhibit, leading the child simultaneously to adapt sociomorally and to do so by uncompromising, repressive measures. However, the major role at δ3 is still probably assignable to Anxiety and to Superego Strength, as indexed in Diagram 12–2.

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[3] In general, we have capitalized Anxiety, or any other source trait, when it is used in the specific sense of a uniquely measured factor, but here, and wherever we use it in a more popular and probably less unitary sense, it is not capitalized.

The relation of the δ to the ϵ or epsilon crossroads is a little unusual, in that virtually the same forces continue at work in the subsequent critical path, ϵ3, as in δ3, for it is still the path of incomplete, attempted repression. (The epsilon crossroads in fact are as it were a continuation and further crystallization of what is happening at δ, the whole emphasis now being on anxious repressive action.) However, probably good claim could be made that the more general personality traits, U.I. 17+, 20+, and 32+ play a larger role in the decision to repress, at δ3, while the Anxiety level, and a narcistic, immaculate quality of the self (U.I. 26+) probably contributes more to the specific attempt at repression, incompletely successful.

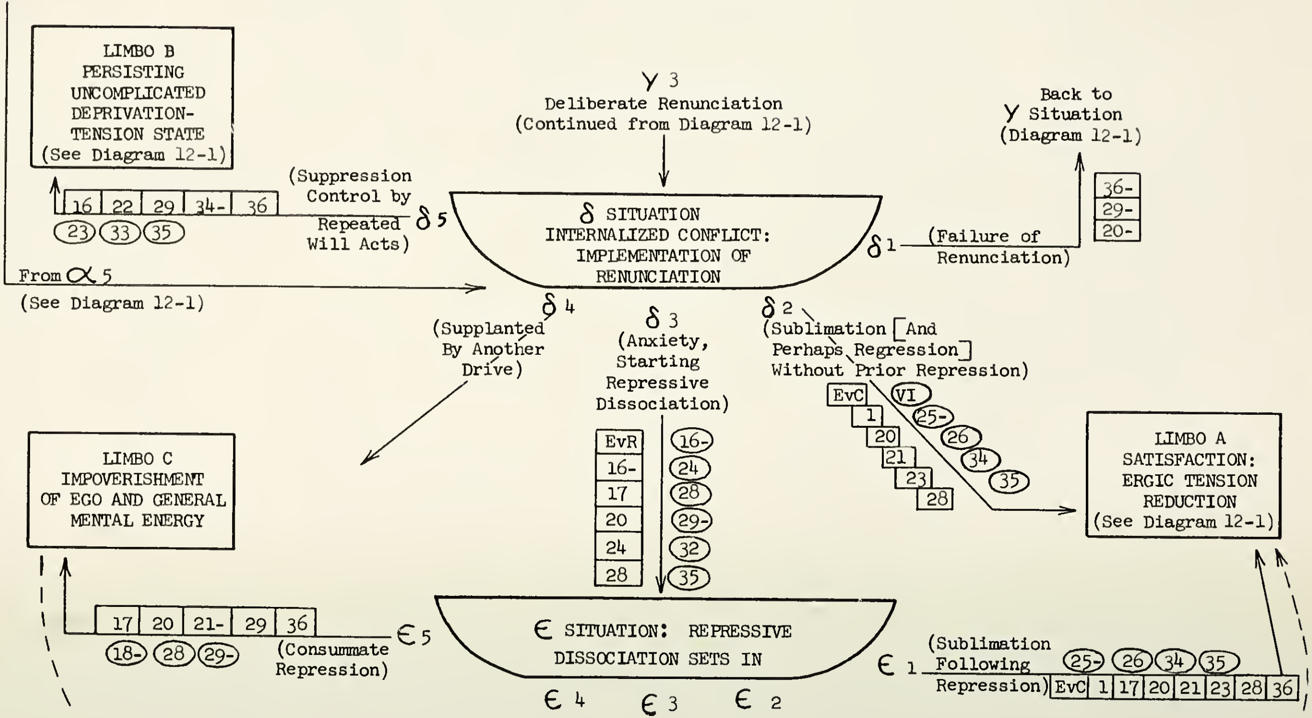
Since the ϵ crossroads represent the point at which neurosis finally becomes inevitable (except for a possible last-minute escape at ϵ1, or to a lesser degree at ϵ2), it is the personality factors operating here that we should expect to show the highest correlation with neurosis. It behooves us, therefore, to discuss their hypothesized action in greater detail than for factors operative earlier. In particular we need to discuss U.I. 16—, Premsia, which has been important in critical paths leading eventually to δ; U.I. 22—, which has usually been a product on these paths; U.I. 28+, which is central in the critical paths from δ and ϵ to Z; U.I. 29—, which is listed as one of the chief causes of a perceived barrier remaining an insurmountable barrier as well as one of the consequences of repression at δ3 and ϵ3; U.I. 17+ and U.I. 19— which have appeared on several paths heading toward neurosis, and U.I. 21+ which, by favoring sublimatory solutions at δ2 and ϵ1, operates against neurosis (even though at α3 it favors encountering of barriers).

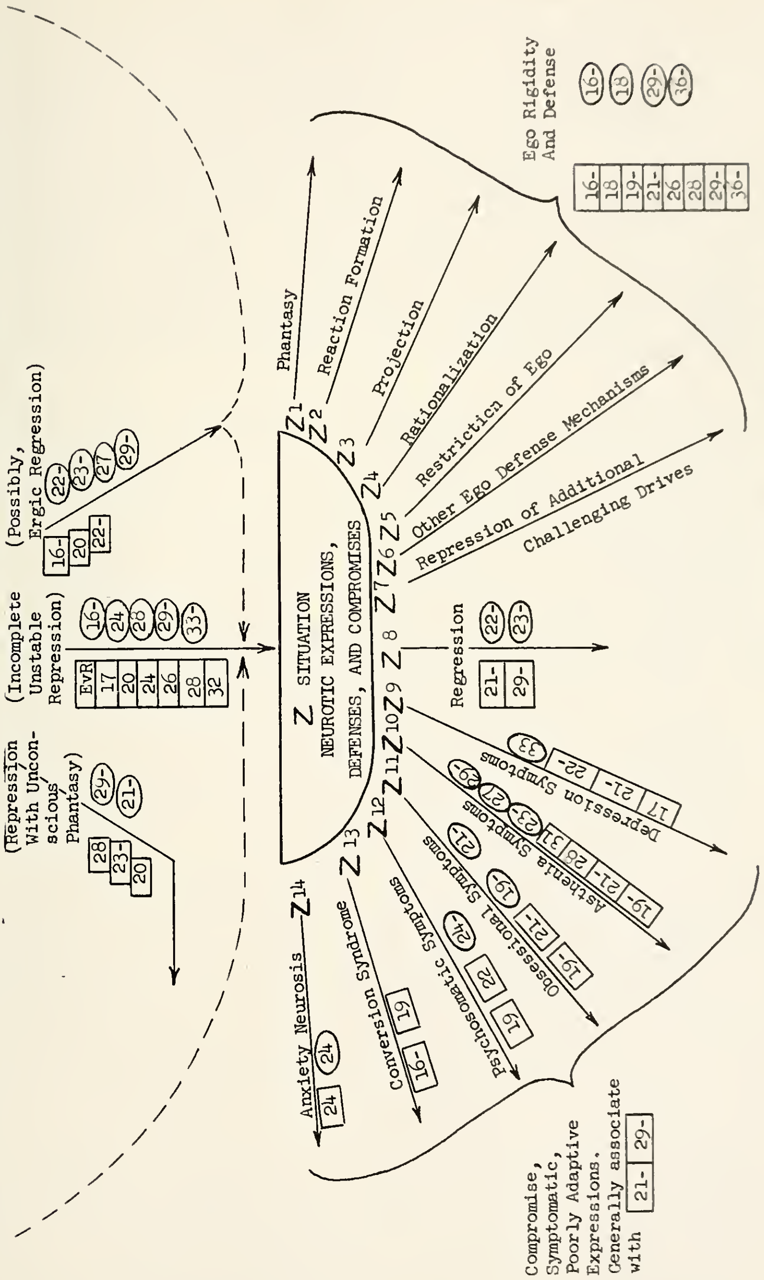
U.I. 28+ was described briefly above as referring essentially to the superego concept, though it is also possible that the larger second-order factor, F(T)I+, Tied Socialization, in which it is loaded, more closely represents what the clinician calls a strong superego. Our hypothesis about U.I. 28+ is that it is a pattern arising in early childhood. It may prove to be an outstanding instance of the action of the principle of ripeness, for it expresses the effects of an ergic control conflict which occurs at a particular, susceptible age—that of about two to five years of age. At that stage, faced first with the restrictions on freedom imposed by toilet training and, secondly, with the ultimate frustration of (need to give up) the Oedipus attachment, the individual may attempt to handle the conflict situation mainly by drastic repression. In this adjustment he is normally aided by an accession in ego and superego development, through the dynamic gain of introjecting (identifying with and imitating) the admired parent and parental values.

Psychoanalytically viewed, the introjection (wholehearted acceptance of parental standards) is primarily a solution to the Oedipal con-

DIAGRAM 12–2

Adjustment Process Analysis (A.P.A.) Chart, Section 2: Personality Associations and Effects of Experience, Formulated for the δ through Z (Internalized Conflict) Dynamic Crossroads.*


LIMBO B
PERSISTING UNCOMPLICATED DEPRIVATION-TENSION STATE
(See Diagram 12-1)
16 22 29 34- 36
23 33 35
(Suppression Control by Repeated Will Acts)
δ 5
From α 5
(See Diagram 12-1)
γ 3
Deliberate Renunciation
(Continued from Diagram 12-1)
δ SITUATION
INTERNALIZED CONFLICT:
IMPLEMENTATION OF RENUNCIATION
δ 1
(Failure of Renunciation)
36-
29-
20-
Back to γ Situation
(Diagram 12-1)
δ 4
(Supplanted By Another Drive)
δ 3
(Anxiety, Starting Repressive Dissociation)
EvR 16- 17 20 24 28
16- 24 28 29- 32 35
δ 2
(Sublimation [And Perhaps Regression] Without Prior Repression)
EvC 1 20 21 23 28
VI 25- 26 34 35
LIMBO A
SATISFACTION:
ERGIC TENSION REDUCTION
(See Diagram 12-1)
LIMBO C
IMPOVERISHMENT OF EGO AND GENERAL MENTAL ENERGY
17 20 21- 29 36
18- 28 29-
(Consummate Repression)
ϵ 5
ϵ SITUATION: REPRESSIVE DISSOCIATION SETS IN
ϵ 4
ϵ 3
ϵ 2
ϵ 1
(Sublimation Following Repression)
25- 26 34 35
EvC 1 17 20 21 23 28 36


Z SITUATION
NEUROTIC EXPRESSIONS,
DEFENSES, AND COMPROMISES
(Repression With Unconscious Phantasy)
28
23-
20
29-
21-
(Incomplete Unstable Repression)
EvR
17
20
24
26
28
32
16-
24
28
29-
33-
(Possibly, Ergic Regression)
16-
20
22-
22-
23-
27
29-
Z1 Phantasy
Z2 Reaction Formation
Z3 Projection
Z4 Rationalization
Z5 Restriction of Ego
Z6 Other Ego Defense Mechanisms
Z7 Repression of Additional Challenging Drives
Ego Rigidity And Defense
16-
18
19-
21-
26
28
29-
36-
16-
18
29-
36-
Z 8 Regression
21-
29-
22-
23-
Z9 Depression Symptoms
17
21-
22-
33
Z10 Asthenia Symptoms
19-
21-
28
31
23-
27
29-
Z11 Obsessional Symptoms
19-
21-
19-
21-
Z12 Psychosomatic Symptoms
19
22
24-
Z13 Conversion Syndrome
16-
19
Z14 Anxiety Neurosis
24
24
Compromise, Symptomatic, Poorly Adaptive Expressions. Generally associate with
21-
29-

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*Identification of influences and effects follows the same system as used in Diagram 12-1, and described in a footnote to that diagram.

flict, permitting, in an abstract sense, the retention of the object. So delicate a transfer could evidently go astray—on the one hand, by an incomplete introjection, occurring when insufficient affection exists or, on the other, by an excessive introjection, building up a powerful superego to the detriment of ego development, when the attachment to parents is extreme. Observation of persons of high U.I. 28 suggests that unusually strong affectional, dependent ties to the parent are characteristic, but that, in addition, further research should look at some sources of imbalance in the structures built up, notably (a) some uncertainty about the parents' affection, as when affection is given only sporadically or is affected by conflict between the parents, (b) that there is not only strong introjection, but that there is unusual demandingness and onerousness in the standards of behavior that the child is asked to adopt.

Examination of the actual behaviors that go into the U.I. 28+ pattern (44, p. 262) suggests that, in the individual subsequently high on U.I. 28, the ego development has in some way suffered damage, or at least, marked restriction as a result of the superego excess. The individual in later life, according to the measured response pattern shows undue deference to authority, together with great will power, more clearly, (or less clearly, obstinacy and contra-suggestibility) in reaching goals, a neurasthenia-like fatigue and obsessional difficulty in making up his mind, pedantry, and an individualistic nicety of viewpoint which prevents his going along as a "good fellow" with the group. The psychoanalytic conception of anal-erotic character seems similar to the above factor. However, we doubt that this pattern could be identified easily with any such a narrow obsessional fixation stereotype.

Although many clinicians will suffer from an "intolerance of ambiguity" if we leave the picture with only this degree of exactness and completeness, yet scientific standards do not really justify us in seeking with present evidence to shape an hypothesis tied more narrowly to particular developmental events, either in terms of a psychoanalytic match or in behavioral description of the way in which the ego development has been restricted in individuals high in U.I. 28. For the time being, the important thing is that we have brought to light, in U.I. 28, a well-checked pattern, and we can now see a definite role which this pattern of Rigid Superego is likely to play in the APA Chart.

The above is as far as one should go on the basis of established correlations; but we may speculate more freely, partly from clinical study of a few U.I. 28+ cases, that the Oedipal relationship was in these cases too strong (for the various reasons which cause a mother to overload the emotional relation to the child), and at the same time, perhaps, too insecure, and that the ensuing introjection was relatively violent, absolute, and unpropitious for further gradual growth of the ego (or modification of the superego). Without unduly enlarging here on the nature of the environment likely to do this and which might be varied, one may mention chiefly (a) defective relations between the parents, resulting in one parent seeking in the affectional relationship to the child what is lacking in the marriage, (b) a similar defect, perhaps extending to actual conflict of standards, which results in doubts about any parental standards, and (c) exacting, highly educated standards in the family ethos applied with efficient psychological skill, so that the child, while accepting high standards, experiences them as an undue burden. In the few cases known to us, the first and last have seemed to predominate, especially the former, as by a son-fixated, dominating mother.

In any case, the outcome seems to be a powerful, uncompromising superego, and a rigid, defensive ego. The latter, in spite of popular interpretations of psychoanalytic evaluation, is still, in certain operational senses, strong, in the usual sense of character. For example, the individual is rated as declining to go along with the crowd, and, in spite of agreeing forcefully with the general moral and scholastic standards of cultural authority, he tends to engage in a constant academic bickering with it. On the other hand, the general, and especially internal, weakness of the ego shows in the shifts of opinion toward successful people and away from neurotics, when he learns what the views of the latter are, as in tests (see 44, p. 262; and Master Index Nos. 193 and 194). The weakness shows also in unproductive rigidity of perception where good, fruitful alternatives are actually possible; also in what seems an emotional, unstable adoption of extreme viewpoints; and again in low morale regarding working time and the attainability of distant goals.

The argument that some initial endowment in the innate preference for repressivenes of U.I. 20 (which in this context might be called repressive temperament) operates *along with* the above environment to help produce U.I. 28 is supported by a substantial positive correlation being found between U.I. 20 and U.I. 28 and, moreover, by their appearance in a single second-order factor F(T)I+ in which U.I. 20 is the most prominently loaded and possibly the causal agent of the whole pattern. F(T)I deserves further consideration in a moment, but meanwhile we shall converge on the definition of U.I. 28 as a condition of ego weakness and superego strength, associated with premature, excessive, repressive action (impoverishing the ego of its potentially contributory ergic ingredients) during the period of toilet training and superego formation, occurring from the second to the fifth year.

U.I. 28 is thus to be entered at $\delta 3$ and $\epsilon 3$ as both a consequence of repressive action (though principally when acting at a certain early life stage) and a continuing cause for handling fresh problems in that way. One can see that in the APA Chart U.I. 28 is not likely to operate before the γ crossroads—or if it does, it will be by the avoidance of life (especially moral) conflict situations that could potentially lead to neurosis. But it should operate fairly powerfully at $\delta 3$ and $\epsilon 3$ in favoring specifically repressive mechanisms, as if the conflict situation does become insoluble otherwise. The rest of the ϵ path associations set out in Diagram 12–2 are mainly self-explanatory. Regression, $\epsilon 2$, could lead either to some satisfaction, as in a perversion when a normal expression is blocked, or to still greater needs for repression, in which case it leads to $\epsilon 3$. Though it is relatively speculative, we have indicated regression as favored by Pathemia (U.I. 22−), a retreat to emotionalism, Comention (U.I. 20+), and Premsia (U.I. 16−), overprotection along with denial of ego needs. At the same time, we have hypothesized that adoption of the regressive path, through pressure of circumstances and possession of the above personality traits which make other solutions less attractive, will generate the pattern of low energy mobilization which we have found in U.I. 23− and which we are inclined to regard as the essence and experimental demonstration of the concept of ergic regression.

The remaining factors for special discussion—U.I. 16, 17, 19, 21, 22, 29, 35, and 36—we will discuss in that order. U.I. 16, Harric Assertiveness *vs.* Premsia, is now fairly well understood as an environmentally determined factor, largely determined, in the direction of the U.I. 16− pole, by a family and culture protected, emotional sensitivity. The individual at this pole has been at once protected from the harsh (harric) realities of life and restricted in freedom. All culture is to some degree paternalistic, and the premsic personality seems higher in societies in which protection of the young and dependency of the young is carried a long way. Although this is a great advantage for indefinite learning and luxuriation in a complex culture, there are many respects in which U.I. 16− would favor neurosis. It would do so at α in disinclining the protected individual to kick against the cultural roof of his house, which is nevertheless a (necessary) psychological barrier. In particular at all β paths, it would preclude violent action against barriers; and at $\gamma 3$, by increasing anxiety at any real break with authority, it would favor the path of renunciation. There is perhaps more to U.I. 16− than this; namely, some tendency to enjoy a subjective, or conventionally dramatized, emotional life (an extreme example, a princess enjoying the theatre while her coachman freezes to death outside), rather than to orient to stark realities. The U.I. 16+ person is rated crude and assertive and raw—he has no magic cloak around him to protect him from the insecurities which he knows to exist—but he is in touch with reality, dependable, emotionally mature. It is conceivable that the U.I. 16— contribution to neurosis, which we should expect to be very powerful in the $\alpha - \gamma$ stages, arises as much from the phantasy escapes ($\beta5$) as from the unwillingness to attack culturally accepted, protective barriers, and therefore to accept a larger cultural burden.

The role assigned to U.I. 17 will vary somewhat according to the presently permissible free play in its interpretation from inhibition to tendency to be inhibited (timidity). If the former, there is little expectation of much association with neurosis; indeed, adequate inhibition would mean the avoidance of emotional extravagances and of life situations inevitably leading to conflict. If the latter, it may mean, for precisely the same reasons as Invia-Exvia (U.I. 32) in the specifically social world, a tendency to handle environmental conflicts more frequently by withdrawal. In fact, it would seem likely that U.I. 17 would enter at many choice points, notably $\gamma1$, $\delta3$, and $\epsilon3$—but at none really powerfully—favoring solution by controlling the drive internally instead of finding external expression for it. Since U.I. 17 is roughly 50/50, environmentally-hereditarily determined, we also feel that it should be given a role as a product of inhibiting experiences, notably as a resultant of repeated failure to break barriers, at $\beta4$.

U.I. 19, Promethean Will (*vs.* Resignation or Subduedness), has a quality of capable egotism, and a history, in criterion studies, of repeated positive correlation with success in situations where determination, resource and masculinity of approach are needed. It has a considerable hereditary determination and must be considered more as a (choice) cause than consequence of any path associations hypothesized. We hypothesize particularly that it should come into action in actual attacks on barriers $\beta1$, $\gamma1$, and less markedly, in by-passing at $\beta2$. Further, in so far as it is environmentally influenceable it will be augmented by success at $\alpha1$ and depressed toward Subduedness and Resignation by $\beta4$, and $\gamma3$. The Resignation pole should have an appreciable association with incidence of the final neurotic process principally because of the high role of U.I. 19— in the $\alpha - \gamma$ stages in accumulating situations in which major needs are not expressed.

It is fortunate that U.I. 21 is considered close to U.I. 19, for unless the psychologist compares their associations side by side there is some danger of allowing the concept of exuberance to get confused with Promethean Will. However, they are very different in life-course and in loadings, in that U.I. 21+ has fluency, speed of decision, and liveliness behavior, whereas U.I. 19+ has criticalness, deadly accuracy, and capacity to think analytically. The metabolic and other associations of Exuberance (U.I. 21) suggest that we are dealing with a dimension of mental energy itself, such as would enter into the versatility of trial-

and-error search for possible adjustments or the resilience with which deprivations are borne. Three possibilities must be considered in relation to neurosis: one, that in terms of a temperamental ardor it will multiply, as we have indicated at $\alpha3$, the number of situations that will be reacted to as barriers; two, that in terms of prolific trial-and-error it will increase the chances of by-passing or destroying barriers, as we have indicated by inserting it at $\beta1$ and $\beta2$, and, three, that in terms of postponing exhaustion and mental impoverishment it will operate against impoverishment of the ego, at $\epsilon5$ (Limbo C), against the apathetic-depression response of $\gamma5$, and against the actual outbreak of symptoms at the Z crossroads. U.I. 21— has been inserted only at Z9, Z10 and Z11; but as a decline of adjustive capacity it would hasten virtually all defense formations.

The functions of U.I. 22 have hitherto been discussed most fully in regard to the state of Corticalertia, and it may be said again that the trait concept, for this almost entirely environmentally determined trait, agrees well with the state concept. We are dealing with an alert, cognitively clear, happy capacity to handle problems on their true merits as against a discouraged, depressed and emotionalized reaction to problems. Probably, the level of an individual on this factor shows more function fluctuation from occasion to occasion than most; yet we have reason for thinking that it may be stable to a degree in terms of representing an educational influence of the family in early childhood, through an atmosphere of clear, objective discussion of problems and difficulties, at a cognitive rather than an emotional level. In this factor of Cortical Alertness we encounter, perhaps for the first time, a dimension where the path associations are almost certainly more due to learning than to choice. At $\alpha3$, it is true, a Pathemic personality would be inclined to see more barriers, but at $\beta4$, the experience of an unbreakable barrier, $\gamma2$ and $\gamma3$, despair and renunciation, and possibly at $\epsilon2$, the emphasis is on the production of an increase in Pathemia (U.I. 22—) through the experience. Through these cumulative contributions to the neurotic process, one would expect Pathemia to show marked associations.

U.I. 29 and 35 are more recently discovered factor-dimensions, not so well defined and understood as earlier factors. U.I. 29 could be either a naturally high level of energy (indeed, something akin to a relative freedom from Diurnal Fatigue) or a strength of will, as implied by its title, Responsive Will *vs.* Low Adaptation Energy. Since it is largely environmental in determination (72) and since as yet we have no evidence that it represents some slowly learned dynamic structure, such as the Self-Sentiment (indeed, U.I. 36 has the hallmarks of the Self-Sentiment), the most likely interpretation is that it represents some general efficiency dimension of the central nervous system, perhaps determined by changing physiological conditions (possibly adrenal or other endocrine efficiencies of response). Our hypothesis, accordingly, takes the definite stand that it is a consequence, not a cause, of the neurotic process, indeed, one of the final consequences showing itself, at $\delta 3$, $\epsilon 2$, $\epsilon 3$, $\epsilon 4$ and throughout the Z development of symptoms processes, as an exhaustion from conflict, from fixation of mental energy in useless unconscious cathexes, and from energy annihilation. However, at its positive pole, it may also play a causal role at $\alpha 1$, in aiding the discovery of solutions, and at $\epsilon 5$ in aiding decisiveness of repression. Because it is so central in the last decisive phases of neurosis, its statistical association should be high, especially with neurasthenic, neurotic fatigue symptoms.

For U.I. 35, no sufficiently validated battery was available when we began this study, so its measures are included, but only outside the regular evaluations. Provisionally, we have defined it as the total degree of long-circuiting of behavior which the individual is sustaining. That is, the U.I. 35+ individual has accepted remote goals, both through superego, self-standards and as a consequence of a history of frustration, and shows a relative immunity to immediate id appeals, as well as the signs of a burden of long-circuiting. Like U.I. 16—, though it may be associated with higher cultural performance, it is also likely to be associated with some steps, notably $\beta 2$, $\gamma 3$ and $\delta 3$, on the way to neurosis; and with $\delta 2$ as a consequence of sublimatory activities. These should result in some positive association of neurosis with U.I. 35+, though it is not intrinsically neurotic. Incidentally, this factor might show more inter-cultural than inter-individual variance, relative to most.

U.I. 36, because it is the most recent personality factor discovered and is yet little investigated, is introduced tentatively. Despite appearing late and, therefore, with relatively small variance, it promises to be important, seemingly constituting the degree of development of the Self-Sentiment, as defined in earlier discussions (44, p. 525). Presumably, high Self-Sentiment development, that is, a strong dynamic investment in the maintenance of appropriate behavior, integrated about the self concept, will be negatively related to neuroticism, because it will aid in dealing attentively and consistently with the problems in the external world (in α through γ) and in gathering sufficient reserves to ensure stable, successful repression at $\epsilon 5$, instead of unstable repression at $\epsilon 3$. (However, it will still contribute, but by that path only, to energy impoverishment.)

In this review we have said little about U.I. 23—, because it has been discussed at length before, but if our hypothesis that U.I. 23—

relates to regression is defensible, then U.I. 23− should enter powerfully at $\epsilon 2$, as a product and as a pre-condition favoring choice of adjustment by unconscious phantasy at $\epsilon 4$, as well as standing in the way of sublimation at $\epsilon 1$.

The whole question of sublimation at $\epsilon 1$ deserves scrutiny. Our assumption from clinical and experimental psychology is that sublimation can occur after renunciation but before repressive dissociation, at $\delta 3$. Nevertheless, as far as present knowledge extends, we would concur with the psychoanalytic view that it normally occurs more readily after some degree of repressive dissociation at $\epsilon 1$—wherefore we discuss it there. As usual, it will be aided by higher intelligence. (Pascal's recovery from an unhappy love affair, for example, by studying the beauty of mathematics unfortunately is not available to all IQ levels.) Further, if U.I. 23+ represents a capacity to mobilize ergic (including general sentiment investments)—an *availability,* as it were, of ergic (instinctual) interest energy for object interests, rather than merely for regressive, sensual (subjective) attachments—high U.I. 23+ should contribute not only to external problem solutions, as we have supposed at $\alpha 1$, but also should aid ergic needs, when blocked and unused, to gain object expression in complex cultural object sublimations. The personality level of the given individual in U.I. 23 at ϵ is thus important through two instrumentalities: it closes $\epsilon 4$ and opens $\epsilon 1$, operating doubly against the threatened neurotic outcome.

However, the sublimation at $\epsilon 1$, as psychoanalysts have recognized, is a path that is adjustive only at a price. A high degree of tension together with possibilities of perversion, accompany the conditions of sustained blocking leading to sublimation. By recording U.I. 25−, Imaginative Tension, as a probable product, we have recognized that an abnormally high level of undischarged tension may persist to some degree after sublimation, and from what we know of Autia, U.I. 34+, with its high level of subjective inner intellectual activity, it seems reasonable to assume that this also would be augmented by sublimation. Although both U.I. 25−, Imaginative Tension, and U.I. 34+, the intensive inner life of autism, are considered, from their nature, to be associated with undischarged drive, there exists no theory, at present, other than that of a temperamental difference, to account for these two distinct directions of expression of undischarged ergic tension. As a probable third product of sublimatory pressure, we have the curious pattern indexed as U.I. 26, which some have considered, prior to the appearance of the more convincing U.I. 36, to have operational reference to the Self-Sentiment. Actually, all the behavior in the U.I. 26+ pattern has the appearance of an educated self-concern, in which narcism and exhibitionism seem to play a role, and in which there is also an unhealthy tension, as shown, for example, by the high proportion of fluency on the self and high performance with approval relative to disapproval. This exhibitionism, suggestive of an Oscar Wilde or some such literary wit at a salon, is, however, associated with powerful and lively will performances, and some real *tours de force* of self-control. U.I. 26, in other words, shows some of the reinforcement of performance one expects from investment in the Self-Sentiment, which could arise, among other ways, through sublimation, especially of narcism and self-assertion.

Trial Evaluation of Hypothetical Influences in the Neurotic Process

In discussing the δ and ϵ paths, little has been said regarding the environmental conditions one would expect to find associated with particular paths. Obviously, by present knowledge, the choices throughout Section 2 of the APA Chart should, relative to Section 1, be determined more by internal characters of personality (even though wholly traceable to earlier environment) than by current environment per se. However, environment may still influence to some extent the courses of the internal conflict. For example, the sublimatory attempts in $\delta 2$ and $\epsilon 1$ would presumably be aided by home environments and cultural conditions which are richer in providing educational interests. Obviously, from the significant correlations with measured scientific, artistic, and musical creativity, the growing individual gets far more such stimulation toward the sublimatory solution if he is brought up in those countries which are historically at a high point in the Cultural Pressure factor (see pp. 280 f.). Consequently, Ev. C, representing such cultural favorableness of environment, is entered at $\delta 2$ and $\epsilon 1$, referring, of course, also to differences of class and family environment. Again, at δ, in the choice between $\delta 5$, suppression, and $\delta 3$, repression, a social environment stressing shame and guilt, as in a fundamentalist religious atmosphere (Ev. R), will presumably favor repression rather than a merely expedient suppression, and possibly the same at $\epsilon 3$ and $\epsilon 5$. But otherwise, although exploration of varieties of environmental influences is ultimately very important, no attempt will be made to fill Diagram 12–2 with speculative shades of environmental difference as yet unknown to play any large part.

By the Z crossroads, the various contradictory conditions of regression, defective ego development, and attempted but incomplete repression which constitute the necessary and sufficient conditions for a general neurotic outcome, have been reached, and the Z or zeta pathways express only the different symptom emphases that are possible. Whatever statistical connections arise between personality and some sort of neurotic outcome should, therefore, be already largely accounted for in terms of the hypothesized crossroad and critical path associations described in α through ϵ. However, there are two ways in which the actual neurotic expressions might be affected even at this point. One, certain personality characteristics expressing some form of low energy resource might favor the more rapid attainment of exhaustion states which could hypothetically be necessary for the appearance of neurotic symptoms generally. Two, the specialized expressions, notably the particular neurotic syndromes, expressible in paths Z1 through Z14, could be explained in terms of different weights in various neuroticism-contributing factors, or general personality factors, in ways discussed in Chapter 7. In view of the completeness of earlier discussion we shall leave the entries in Diagram 12–2 largely to describe the second class of connections. But, we can say that the strong growth of ego defenses (Z1 through Z7) might be expected particularly to flourish with marked Narcistic Self-Will (U.I. 26+), with Rigid Superego development (U.I. 28+) and perhaps with defective Self-Sentiment Integration (U.I. 36−), as well as those factors, U.I. 16−, 18+, and 19− which appear in the second-order F(T)II−, Ego Weakness. In particular, we suspect U.I. 18+ to be some kind of compensatory, defensive shrewdness for an essentially weak ego. Some of these are listed at Z1 − Z7 as both causes and consequences of rapid growth of ego defense props.

In the Z8 through Z14 neurotic expressions, the hypothetically associated personality factors are shown individually, but only for outstanding instances. The asthenic phenomena should arise more with U.I. 19−, 27, 29−, and 31; the depressive, with U.I. 17, 21−, 22−, and 33; the conversion hysteric, with U.I. 16−, etc., and, of course, anxiety hysteria is going to be the major expression for individuals already high in U.I. 24.

In regard to the low energy class of personality effects (mentioned in an earlier paragraph) in determining the final breakdown into the neurotic expression at Z, it is a moot point in representation whether they should be entered at $\epsilon 3$, or at individual Z expressions. We consider the latter because there is a sense in which a weakness in personality endowment, in the reserves of energy to combat the inroads of disintegration, is a permissive condition, quite distinct from the cause constituted by inadequate repression of overwhelmingly strong complexes, at $\epsilon 3$. The personality factors which have this global energy quality and qualify as possible hypothetical postponers of breakdown, for a given amount of conflict and useless energy cathexis, are U.I. 19+, Promethean Will; U.I. 21+, Exuberance; U.I. 23+, High Mobilization; U.I. 27−, Keen Involvement; and U.I. 29+, Energetic

Will. The most likely of these, U.I. 21— and 29—, are added to all paths in Z as predisposing conditions. The state of impoverishment of general mental energy to which $\epsilon4$ and $\epsilon5$ contribute can be nothing but another limbo on the way to the final neurotic Z situation, and low U.I. 21—, 23— and 29— could all, theoretically, be consequences of its action. However, they would reach disablingly low levels sooner if the previous endowments were low.

In our brief discussion above, U.I. 29— has been defined, descriptively, as a generalized fatigue, showing principally as a decline in performances concerned with handling a constant onslaught of external demands. Its role in neurosis is presumably in the expression of the final symptoms, which have the general character of inability to cope with environment. On general clinical observation, one may hypothesize also that a second common result of prolongation of the neurotic deadlock would be still further ergic regression, as suggested above, for which reason Regression, (U.I. 23—) is entered as a further consequence at path Z8. No direct proof of this hypothesis exists, as yet, but one check would be to see if the differences of neurotics from normals on U.I. 23— are greater for long-standing neurotics. Finally, as to the more specific neurotic symptom expressions, Z9 through Z14, etc., the associations discussed in Chapter 7 would be expected to align with them, notably greater association of Anxiety, U.I. 24, with Z14, etc.

It remains to take stock of the possibilities of interpreting certain path associations alternatively in second-order factors. We have already noted, in (Diagram 12–1) the first, pre-internalization phase in the APA Chart, that the pattern of primaries in $\alpha4$ resembles F(T)V, History of Inhibition, that the paths to limbo A have in common the primaries of F(T)II, Expansive Ego, and that $\beta5$ has the primaries of F(T)VI, Narcistic Development. Beyond these we may now add some resemblance to F(T)III, Temperamental Ardor, at $\alpha3$, encountering barriers; a clear resemblance to F(T)I, Tied Socialization, at $\gamma3$, renunciation with anxiety; and a matching of what is common to the transitions from α through γ to F(T)VII, Controlled Drive Tension. Additionally, the F(T)VI pattern which was seen at $\beta5$ can be seen again in the sublimatory and regressive paths $\delta2$, $\epsilon1$ and $\epsilon2$ which have convergence on Limbo A; and the F(T)II pattern appears again at the Z outcomes. Other hypothesized associations are as shown in Diagrams 12–1 and 12–2.

With the existing methodological inability to assign more exact quantitative form to our hypotheses, it is difficult to determine how close the fit of the above second-order factors to the APA Chart groupings of factors really is.

By reason of their known major roles in neurosis (Table 5–3), the test factors of Superego, F(T)I and Ego Strength, F(T)II deserve intensive research, particularly as to their possible identifications with clinical rating of superego and ego strengths. The pattern of F(T)VI is also intriguing as a pattern of sublimatory development in which the frustrated ergs are somehow given expression and investment in the conceptual self, with narcistic inflation and an overvaluation of internal, phantasy expression.

Summary

1. Major conclusions from experiment, regarding the structure of neuroticism and anxiety in relation to common personality factors, have been listed to represent the outcome of the past eleven chapters. These are the closely, empirically rooted constructs and conclusions with which all theoretical developments followed here must be consistent.

2. The factors with significant relation to neurosis are listed with their empirically demonstrated, corresponding state dimensions, where they exist. Five trait factors are highly involved and are called neurotic process (np) factors, five or six are less involved as neurotic-contributory (nc), and one or two others are possibly neurotic-contributory. Second-order objective test factors are also listed, giving additional structure to the primary associations. While it is unlikely that this list is completely exhaustive of psychological factors involved in Anxiety or neurosis, a rough estimate of degree of association suggests that they may account for a large part of the variance in neurosis.

3. In theoretical development, the chief enterprise is that of predicting the associations of personality factors and neurosis in terms of (a) pre-existing, sometimes constitutional, traits causing choice of certain adjustment paths, and (b) the learning experience of certain paths producing certain trait changes. There already exists, in the Adjustment Process Analysis (APA) Chart, a theoretical framework for systematically examining the whole range of possible adjustment responses and sequences. The present chapter envisages bringing the APA Chart into relation with both a taxonomy of cultural environmental situations, which will permit inserting quantities for the severity, etc., of frustrations, trauma, etc., and the path-personality factor associations in traits related to path choice and the learning experience of the paths causing trait changes (a) and (b) earlier in the paragraph.

4. From present knowledge of the factors and their experimentally determined loadings in various kinds of response behavior, the expected associations of paths and factors are stated as exactly as a non-parametric method will admit, by factor numbers and signs inserted in a path-personality chart.

Brief explanations of the hypothesized mode of interaction are given. For example, in terms of traits determining path choice, low intelligence, U.I. 1—, will more frequently lead to failure to overcome barriers to ergic satisfaction; high Exuberance will lead to more frequently encountering barriers; high general Inhibition will lessen the tendency to attack barriers; high Invia will diminish the likelihood of trial-and-error solutions in relation to social barriers; and so on.

5. In terms of learning effects, or other changes appearing as consequences from repeated experience of paths, it seems reasonable to hypothesize that Resignation or Subduedness (U.I. 19—) is increased by experiences of failure to overcome barriers; that such failures referred to the self will decrease the self-confidence and resource shown in U.I. 16+; that high tension through deprivation may increase Imagination Pressure, U.I. 25—; that a retaliating barrier may raise fear and the anticipation thereof, Anxiety, U.I. 24, and so on.

6. The first three crossroads in the Adjustment Process Analysis Chart—α, β and γ—are concerned with the fate of ergic and ego needs as they encounter external barriers and deprivations. The second three crossroads, δ, ϵ, and Z, are concerned with internalized conflict and the fate of a renounced drive. Here again, it is possible to see certain personality factors as likely to be associated with particular paths. For example, Self-Sentiment, U.I. 36, will favor repression rather than resort to compensation by phantasy, etc.

7. In regard to learning effects, the personality impact of a particular path will depend on frequency of traversing it, the magnitude of the cultural situation involved, and the age of the person at the time the experience occurs. Though we have no very direct evidence, our hypotheses about certain path-personality associations (for example, of U.I. 28), lean a good deal on a principle of ergic ripeness based largely on animal learning experiment and psychoanalytic evidence of the peculiar effects of early conflict. Accepting the general principle, despite doubt on actual ages and drives, means that certain personality factors may be expected to develop largely through experience of particular paths occurring only, or most often, at certain ages.

8. The above environmental learning effects should show themselves in our present data, principally as statistically significant, neuroticism associations for personality factors known to be influenced by environment. However, new, longitudinal experiments could and should check on this by correlating personality change scores with actual environmental measures. Among the environmental influences thus indicated to be potent are unduly high or strictly applied standards; overweighting of, or insecurity in, the parental emotional relation to the child; a home atmosphere in which emotional reactions to problems

rather than objective cognitive analysis are the norm; a competitiveness accentuating failure through physical or mental defects, and an overprotected atmosphere in which loss of freedom for self-development is the price paid for secure dependence.

9. Examination of the hypothesized connections of adjustment paths and primary personality factors reveals that the grouping for certain paths and limbos has an apparently greater-than-chance resemblance to particular second-order objective test factor groupings. The second-orders are at least clear enough to enable intelligible hypotheses of path association to be stated for all but one or two among the seven second-orders.

10. It should be possible to infer, from the hypothesized path-personality associations, what the experimentally expected statistical level of association should be between each personality factor and the condition of having arrived at the final neurotic impasse. In general, the highest degree of association should be shown by: (a) factors differentiating most between the critical path (that proceeding to the next crossroads) and other paths at the same crossroads; (b) factors differentiating at later rather than earlier, less final crossroads; and (c) factors differentiating repeatedly in the same direction in the history of the adjustment process.

11. The theoretical system started here has potentialities for more exact use, which will be explored in the next chapter. The present aim has been a roughly quantitative statement of hypothesized psychological path-personality associations based on knowledge of personality factors. These associations must be of a very substantial magnitude in view of the total result (Chap. 5) of multiple correlations of about .6 to .9 between factor scores and the final neurotic outcome as clinically evaluated.

CHAPTER 13

THEORETICAL AND RESEARCH DEVELOPMENTS IN A CALCULUS OF ADJUSTMENT AND CONFLICT

Aims and Scope of Further Treatment Through Analytical Adjustment Theory

Using concepts derived from clinical theories of adjustment and from experimental measurement of personality factors, we have proceeded in the last chapter to a new, integrated statement of the adjustment process in terms of personality factor concepts. This statement takes the final form of a set of testable hypotheses, in terms of an Adjustment Process Analysis or path-personality chart, regarding the associations to be expected between personality measurement and neurosis.

The path-personality chart applies, of course, to more than neurosis. It provides a scheme for examining personality-learning generally. Our aims in this chapter are: (a) to develop the implications of the path-personality chart, both for general hypothesis-testing and individual clinical case-handling; (b) to examine the hypotheses of the preceding chapter on the neurotic process against our accumulated data, now mainly in Tables 5–1 and 5–3; (c) to compare and contrast the theory which emerges from our checked hypotheses with current pre-metric clinical theories; and (d) to introduce a source of experimental evidence, namely, that having to do with dynamic trait measurement, which is newer (and untried) contrasted with the developments in general personality measurement on which this book is mainly based, but which offers promise of powerful supplementation; finally, (e) to attempt to tidy up a number of observations made along the way. In regard to the last aim, it must be recognized that in this book we have been cutting a pioneer path through a jungle. It behooved us first to hew to a navigational line toward our objectives, but now we can comment on the cross tracks, and scents, and branching-off points for new research encountered by the way.

Beginning with development of implications of the path-personality formulation, let us recognize that (i) the acquisition of neurosis, which has been our main theme, is really only a special case in the general study of personality change, and (ii) the general problem is the formulation of the relations between a multidimensional entity called personality and a multi-path environmental experience. The relations must be recognized as proceeding causally in two directions—personality influencing choice and choice influencing personality. For the moment, we shall concentrate on the latter, which requires a special digression on learning theory.

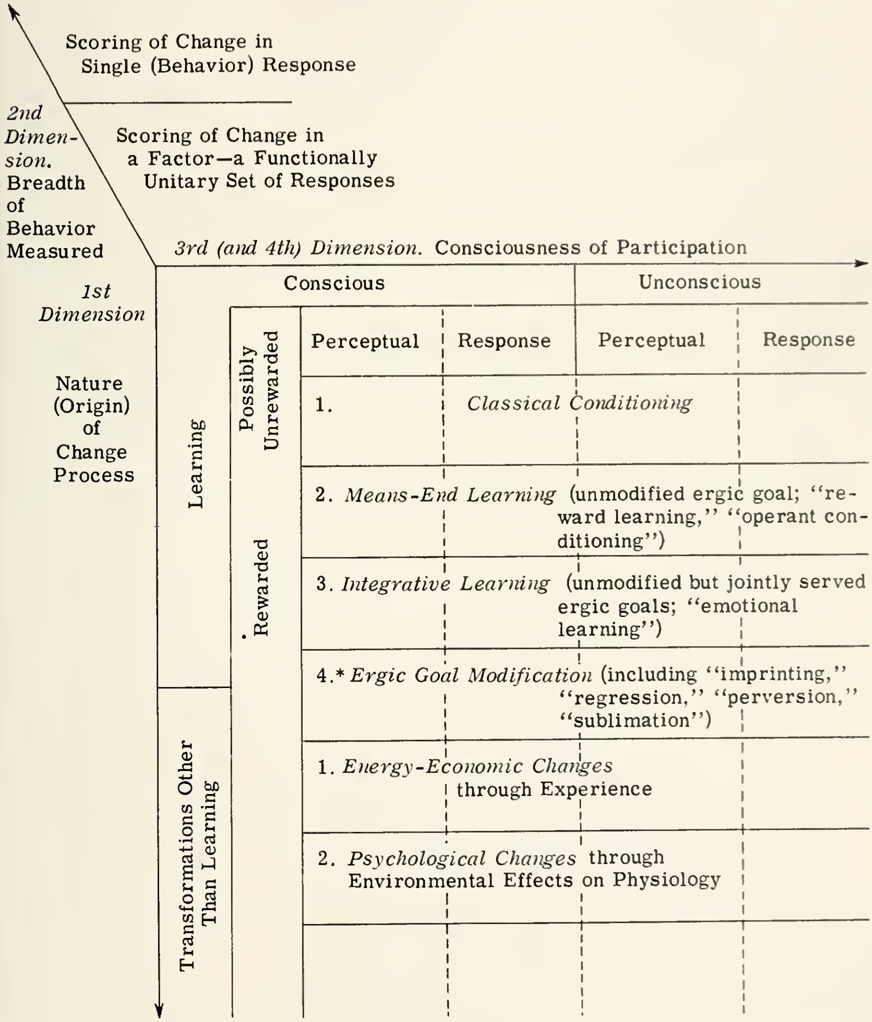
Learning theory as currently understood represents a somewhat incomplete picture of the learning theory we conceive to be necessary for personality theory. Recent discussions of learning theory and personality theory have brought out discrepancies, which may be briefly stated as: (i) Most learning of interest to personality study is reward learning, whereas the bulk of learning theory—at least by Pavlovians, here and abroad—has concentrated on classical conditioning applicable largely to reflexes only. (ii) Learning experiments have been concerned mainly with the rate and conditions of acquisitions of specific pieces of behavior (even as part of reward learning), whereas a personality theory must discover how whole personality dimensions (factors) change. (iii) About 95 per cent or more of learning experimentation has been what may be called means-end learning rather than what we define in the following paragraphs as integration learning. (iv) The learning theorist commonly has abstracted, quite arbitrarily and unwittingly, a single item from what is the total organic learning process, and it seems likely that no such oblique slice from the totality can be understood and accurately predicted without recognizing the whole process.

This digression on learning must be brief, so we refer to Cattell's development elsewhere (44) leading to the classification of learning principles and experiments set out here in Diagram 13–1. Skinner (204), Schlosberg (196), Cattell (44), and Mowrer (163) have distinguished between classical conditioning and reward learning. The additions here are a subdivision of reward learning, distinguishing between simple *means-end learning* in which skills are acquired toward a single goal, as in a rat satisfying hunger by running a maze, and *integrative learning* in which the organism learns to make a choice or compromise between different ergic goal satisfactions in the interests of a total greater satisfaction (of all ergs) for the organism. From our view, learning experiments to date, when not concerned purely with conditioning, have been too preoccupied with means-end learning. But in the clinical and personality realm the important changes that occur are mainly in integrative learning.

The fourth variety of learning is stated with less confidence and cannot be classified further until some experimental research is undertaken. It appears from clinical evidence that, without any change in means-end learning (see 2 in Diagram 13–1), there can be changes in

DIAGRAM 13-1

VARIETIES OF TRANSFORMATION (OF LEARNING AND OTHER TRANSFORMATION)


Scoring of Change in Single (Behavior) Response
2nd Dimension. Breadth of Behavior Measured
Scoring of Change in a Factor—a Functionally Unitary Set of Responses
3rd (and 4th) Dimension. Consciousness of Participation
1st Dimension
Nature (Origin) of Change Process
Conscious
Unconscious
Perceptual
Response
Perceptual
Response
Learning
Possibly Unrewarded
Rewarded
Transformations Other Than Learning
1. Classical Conditioning
2. Means-End Learning (unmodified ergic goal; "reward learning," "operant conditioning")
3. Integrative Learning (unmodified but jointly served ergic goals; "emotional learning")
4.* Ergic Goal Modification (including "imprinting," "regression," "perversion," "sublimation")
1. Energy-Economic Changes through Experience
2. Psychological Changes through Environmental Effects on Physiology

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*4 is placed here because it may be either learning or "transformation other than learning."

the nature of the desired goal or the strength with which it is desired. By Freudians these are conceived as arrests in a normal maturational process and are thus, in a sense, "changes in constitution." But obviously if they occur through environmental differences of experience (physiological as well as psychological), they are a form of learning, though more intimately connected with constitutional maturation processes than most. Fortunately they can be clearly distinguished by their nature, regardless of mode of origin, in that they concern changes in the direction and strength of the goal need itself.

Doubtless, in life, all kinds of learning occur together. For example, an ergic goal modification—such as from heterosexual to homosexual or from weak to strong inherent need for security, possibly through physiological experiences—may occur even while the individual is trying to learn better ways to the first goal. But since these learnings are different and presumably obey different laws, the task of comprehensive learning theorists is to study them separately. In Diagram 13–1, the cross classification on two dimensions suggests there are at least twelve varieties to be studied. There are twenty-four types, when Perceptual and Response Modifications are considered as a third dimension. Additionally, there is a fourth dimension possible, namely, the study of these types of learning as single entities of behavior and as whole factor measurements respectively. Thus a careful regard for the possibilities of different learning processes might lead to a taxonomy of as many as twenty-four types, but probably, since some combinations would be paradoxical and impossible, the number is nearer a dozen.

In the personality realm, an economical learning theory should be based on factor score changes rather than measures of single specific behaviors. It is an objection to much of present learning theory that not only does it fail to provide information about factor change, but that even the specific behavior change is, almost certainly, incompletely predictable because of its quite arbitrary isolation from a total organic learning process. A monkey being taught to avoid touching a certain one-inch square on the floor is undoubtedly learning this behavior, from the controlled experimental situation, but a great deal besides. Control in the fullest sense of the term would be gained if the experimenter discovered first what is the dimensionality of the total change.

Of course, there is already clear evidence in humans that frequently, in the attitude and habit realm, a factor aligns itself with the learning process. That is to say, certain factors, such as the sentiment for religion, for career, etc., are the creation of long-term learning processes in which the repeated exposure to a single sociological situation or institution has simultaneously engendered growth in two or three dozen separate attitudes, and presumably (though this is not yet checked) in many skills. The result of the learning process is then growth on a single factor, and, incidentally, it would be a poor experiment to measure this learning, with low reliability and validity, on any single variable instead of on an estimate from a factor battery.

Such single-factor growth from a single learning situation may occur in attitudes and skills, but in the realm of general personality factors, for example, Ego Strength and Desurgency, it is more likely that many situations (ergic goal strength disposition, or temperamental tendency, and so on) affect the growth of a single structure. A comprehensive learning theory would, of course, accept single-factor learning as just a special case in a general treatment which relates all degrees of factor learning to a given situation.

Lastly, in this brief review of our basic learning theory, we must raise the possibility that some learning should be considered as a subcategory within that change through experience which would be better called a Transformation (rather than learning) Theory. For example, in the course of being trained for a race, a sprinter may learn to run faster, but he may also develop a stomach ulcer which shows as a modification of the dependent variable. Did he learn the stomach ulcer? There is also the fact that experience may almost as frequently lead to a downhill as an uphill curve; for example, a child exposed to the classroom may become more shy rather than less shy. Because of concentration on acquiring reflex responses and running mazes, the present-day learning theorist has difficulty in thinking of deteriorative changes as "learning." Possibly, his reluctance should be accepted, though we believe in most cases the distinction is only a product of conservatism and could be eliminated by flipping an algebraic sign, that is, by reversing the direction of the factor or score measured.

Nevertheless, there may be whole ranges of yet unexplored instances in which there will prove to be a real difference within what we shall generically call transformation, between, on the one hand, what can properly be called learning, and, on the other, what might be called economic or resource change. The latter would include psychological changes produced indirectly through physiological experience, for example, the movement toward Desurgency in a man who experiences a series of catastrophes, or the psychological changes with aging, etc. Some learning theorists might also wish to exclude our type 4, Ergic Goal Modification (Diagram 13–1), from learning theory proper; and we would agree that pending further research on its nature it could be included reasonably and equally in resource change theory. In what follows we may at times roughly apply the term learning theory to the total change through life experience, but in clearest principle we shall regard Transformation Theory as that which deals with change through experience, and we have subdivided it into Resource (Energy-Economic) Change Theory, and Psychological Change (Learning) Theory.

Adjustment Theory: The Matrix Treatment of Personality-Adjustment Process (P.A.R.) Relations

It is reasonable to assume that with enough attention to learning data on personality factors in relation to actual life paths, a growth of transformation theory will occur that will permit the assignment of an exact figure for the normal transformation of each personality factor occasioned along each path of the Adjustment Process Analysis Chart (Chap. 12). If transformation theory were itself the central object of our discussion, we should be more specific about the form which this index would take and the parameters of the path (and person) that would be needed to fix the quantity.

Most probably, the index would take the form of a percentage increase (or decrease) in standard score on the factor through one experience of the path. If the relation for repeated transits should prove linear, this would amount to a regression coefficient (tangent), but if the curve should be complex, a more complex set of constants would have to be used to predict personality transformation (or learning) with repetition or increased length of exposure.

The parameters of the potency of a path, as already briefly indicated, would be the age of the person when encountering it and the dimensions of the taxonomic object in our culture involved in the psychological path. For example, the $\alpha 4$ path of deprivation would have dimensions qualifying its potency from that of losing a doll at ten years of age to losing a mother at, say, four years. What we shall call the path-transformation coefficients (or more fully, adjustment-path-transformation coefficients, to distinguish them from the statistical-path coefficients of Sewall Wright) are thus in themselves analyzable into indices for the general path and indices for its specific taxonomic environmental setting. What we should deal with here as the path coefficient, applicable to the experiences of a particular person, is, in fact, the product of a general path-transformation coefficient, stating what such an experience does, in the average setting, and a taxonomic object-potency index, bringing in the usual emotional weighting of the cultural object in connection with which the given individual had these adjustment experiences taken together with a ripeness or "imprinting" value according to the person's age.

A special area of study thus opens up within transformation matrices themselves. Without pursuing these interesting possibilities of generalizing and standardizing the learning or, more accurately, the transformation values of the various cultural-environmental objects (which the clinician must regard principally as sources of trauma, and at present can evaluate only roughly), let us assume that specific path-transformation coefficients have been provided. Now the personality tie-up actually found with a given path experience will be the combined result of learning and of personality tending to determine the choice. Stated in more final terms, the path-personality coefficient will be a combined function of the path-transformation and the path-choice coefficients.

This quantitative relation in the calculation for any given individual corresponds necessarily to a relationship of fields of investigation (and the bodies of principle emerging from each). In short, transformation-theory and path-choice theory are two realms of study which can be separated for intensive study of their separate principles, but must be related in the end to an inclusive personality-adjustment-record theory, or analytic adjustment theory as here defined, i.e., the relation of the emergent personality to the individual's adjustment record. The relation of these and other contributory components are presented schematically, for quick grasp, in Table 13–1.

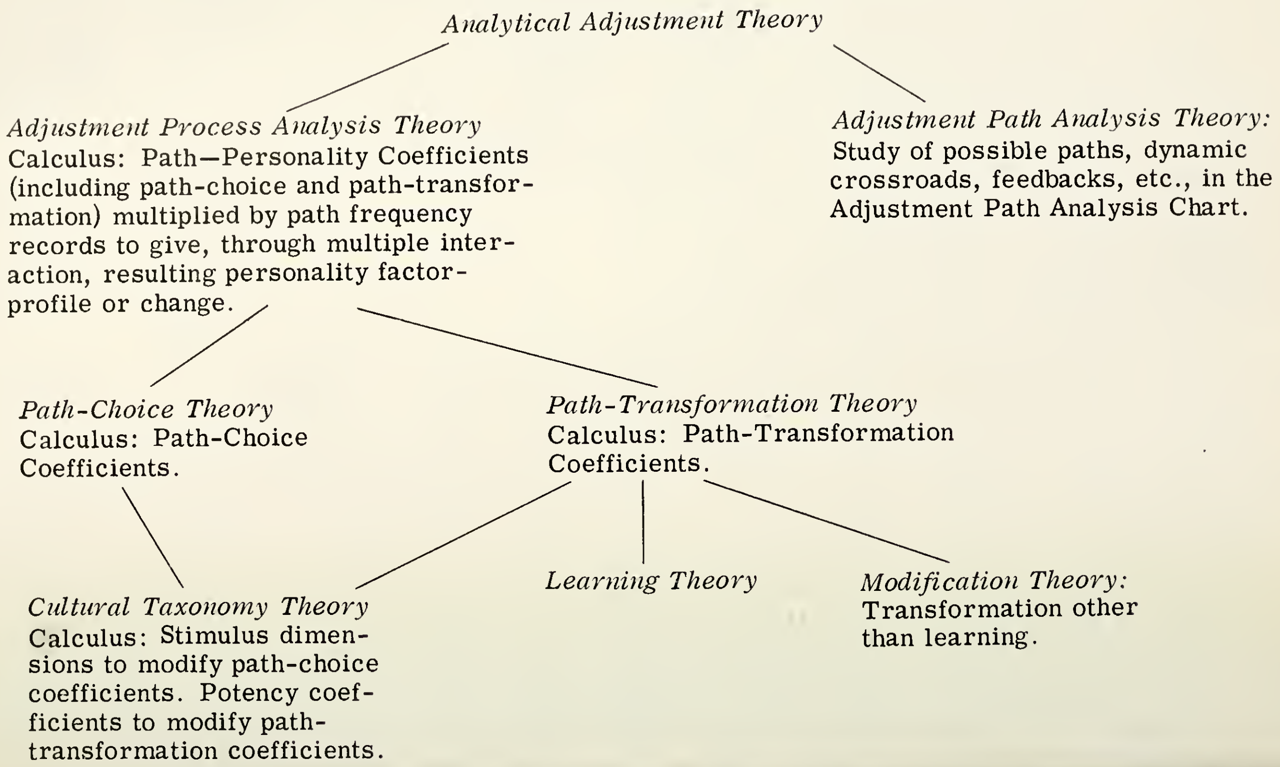
It will be noted that each of the three main categories of study—adjustment theory, path-choice theory, and (path) transformation theory—has a particular type of computational coefficient attached to it, namely, the path-personality coefficient, the path-choice coefficient, and the path-transformation coefficient, respectively.

Now it can reasonably be expected that on any of these three systems—say, the path-personality system, for example—the personality associations of a particular path will be several. Conversely and consistently, the changes on a particular personality factor will be accounted for by experience on several paths. Thus, although initially one thinks of a single index relating a single path and a single personality dimension, the full expression will be, formally, identical with the factor specification equation, in that a single path will have coefficients for all factors and a single factor will have coefficients for all paths. In short, as we shall see, the full psychological information will have to be expressed as a matrix, bounded by personality dimensions on one side and paths on the other. The nature of these matrices and their arrangement in the process of multiplication to derive the resultant personality estimate from the path-personality coefficients and the knowledge of the frequency with which the person has followed those paths are illustrated in Diagram 13–2.

It is also evident that the coefficients are likely to be such as predict in terms of standard scores. That is to say, we shall use the standard on a factor, representing the individual's deviation from the group mean on that trait in the C matrix of personality profiles and, in the path scores of matrix B, his deviation from the average frequency with which

TABLE 13-1

Areas of Theoretical Development, and Associated Calculus, Within Analytical Adjustment Theory



Analytical Adjustment Theory

Adjustment Process Analysis Theory
Calculus: Path—Personality Coefficients (including path-choice and path-transformation) multiplied by path frequency records to give, through multiple interaction, resulting personality factor-profile or change.

Adjustment Path Analysis Theory: Study of possible paths, dynamic crossroads, feedbacks, etc., in the Adjustment Path Analysis Chart.

Path-Choice Theory
Calculus: Path-Choice Coefficients.

Path-Transformation Theory
Calculus: Path-Transformation Coefficients.

Cultural Taxonomy Theory
Calculus: Stimulus dimensions to modify path-choice coefficients. Potency coefficients to modify path-transformation coefficients.

Learning Theory

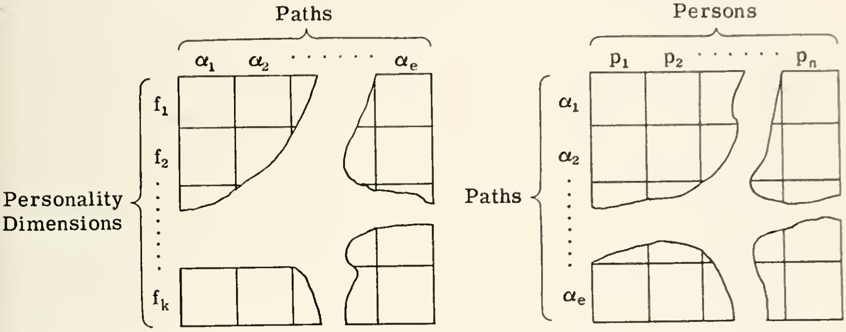
Modification Theory: Transformation other than learning.

DIAGRAM 13–2

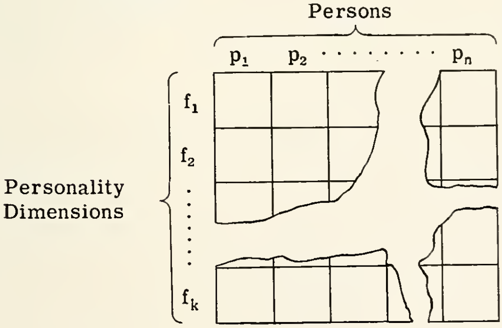
Chief Matrix Calculations in Analytical Adjustment Theory

1. *Calculation of Expected Personality Profiles from Record of Path Frequencies (Experience)*

Formula (i) $C = AB$, which can be set out in detail as follows:


Paths
α_1
α_2
α_e
Personality Dimensions
f_1
f_2
f_k
Persons
p_1
p_2
p_n
Paths
α_1
α_2
α_e

A. Matrix of Path-Personality Coefficients (Choice + Transformation) × B. Matrix of Path Frequency Record Coefficients =


Persons
p_1
p_2
p_n
Personality Dimensions
f_1
f_2
f_k

C. Matrix of Personality Factor-Profiles (Absolute and for Increments)

2. *Calculation of Path Frequency Experience from Personality Profile*

Formula (ii) $B = A^{-1}D^{-1}C$, where $D = AA^1$

3. *Calculation of General Path-Personality Coefficients from Experimental Data*

Formula (iii) $A = CB^1D^{-1}$, where $D = BB^1$

the given cultural group follows that path. From this it will be seen that we can, in principle, make the following calculations:

1. Knowing that a person followed certain paths with certain frequencies we can make an estimate of what his personality will be like. This is Formula (i) in Diagram 13–2. If, instead of using

total personality-path coefficients, we separately employ path-choice and path-transformation coefficients this can be split into two equations. Thereby C will appear as a matrix C_1 of absolute personality levels stating what aspects of this personality are due to his originally being the sort of person who makes those choices, and another matrix C_2 which is a matrix of personality changes ($C = C_1 + C_2$) due to his experience of those paths.

2. Conversely, knowing that a person at this moment of testing has such-and-such a personality profile, we can estimate the unknown frequencies with which he followed various paths. This is represented in Diagram 13–2 by Formula (ii). The logical and mathematical possibility naturally occurs to one that a given personality profile might be produced by several different combinations of paths. It is true that a given level on any single personality factor can be reached by such numerous alternative combinations of path frequencies. But it follows from matrix algebra that a unique total profile of personality factor scores (granting fixed coefficients of relationship for the population generally) can be reached only by one unique set of path experiences.
3. From a researcher's point of view, the most valuable formula is that by which one would derive from data on personality and data on experience the path-personality coefficients (or the component path-choice and path transformation coefficients). This is given in Formula (iii) in Diagram 13–2.

In the usual mathematical terms the equations from which we derive the rows and columns of our product matrices; and which we have said are formally the same as the specification equation, are second-degree equations in n terms, consisting of a series of paired index products. Their form and the procedure in using them had best be illustrated now. Let us take path $\beta 1$ from the APA Chart (Diagram 12–1) in which the person decides to "take arms against a sea of troubles and, by opposing, end them" (rather than select, say, the $\beta 5$ phantasy path, which Hamlet initially chose). In this illustration we shall use an accuracy of estimate of the coefficients that is not currently attainable in the values obtainable from our present empirical data, in which we are content often to reach a mere non-parametric approximation. Letting R represent the actual frequency, in standard score, with which a person is likely to have followed the path $\beta 1$, we may hypothetically state:

$$R_{\beta 1} = .5F_{16} - .2F_{18} + .6F_{19} + .1F_{21} + .2F_{22} + .2F_{23} + .3F_{36}$$

in which F_{16}, F_{18} etc., are the individual's endowments (in standard scores) in factors U.I. 16, U.I. 18, etc. The numerical values are the path-personality association coefficients. We may suppose that in the case of F_{16} most of the .5 comes from choice determination: people high on Harric Assertiveness (U.I. 16) are likely to try directly to break the barrier. The —.2 coefficient on F_{18}, however, is hypothesized as due to the fact that the insecurity and wariness of U.I. 18 is likely to be reduced by experience of success in straightforward attack on a barrier (path-transformation), and so on, with each path personality coefficient constituted by a combination of a path-choice and a path-transformation coefficient.[1]

One advantage of this model is that it permits us to proceed by the use of matrix multiplication, so convenient for computers, to a calculation of the estimated *total* personality profile of a given individual, if one knows his adjustment process experience. Or conversely, as pointed out in Diagram 13–2, Formula (ii), to obtain an estimate of his adjustment process experience (path frequencies) if one knows his personality profile, or, Diagram 13–2, Formula (iii), to calculate path-personality, –transformation, and –choice coefficients for which other forms of calculation and experimental design would not permit unique solutions.

Lest anyone perceive the matrix treatment of analytical adjustment theory as merely a computing system for individual cases (and then largely because of its economic practicability and speed of handling), let us emphasize the third point above: the unique applicability to basic research goals and the value of the theoretical framework. Here we may note: First, the theories must be tested, for statistical reasons, by sampling a sufficiency of individual instances. The capacity of this computing design to handle many cases is important to us precisely because it gives that ability to test a theory which is so sadly missing from present attempted clinical generalizations by a personal judgment from a few cases. Second, the simplicity of the calculation is a by-product of the simplicity of the theory, the additive and linear relations being appropriately given first chance, before trying more complex functions. And, third, this is the only form of calculation so far proposed in learning theory which offers the means of investigating the total learning experience, i.e., the effects of many aspects of the learning experience upon all behavior dimensions of the organism, with regard for total interaction.

Having illustrated the single specification equation by actual figures, let us proceed also to illustrate by an actual example how figures

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[1] If it is objected that the model oversimplifies, we would reply that attempts to introduce theoretical refinements of mathematical models far beyond their stage of actual psychological use is often not only academic pedantry, but a tactical error in theoretical development. For it is only after adjusting the model's details, in conformity with experimental discoveries about the way nature works, that an approach can be made to evaluating the goodness of the whole and to making radical refinements, if needed.

TABLE 13–2

Illustration of Multiple Interaction Calculation by Analytical Adjustment Theory Matrices

Matrix A
Path-Personality Coefficients
(Personality-Adjustment Record Theory)

	Paths					
Personality Factors	$\alpha 1$	$\alpha 2$	$\alpha 3$	$\beta 1$	$\beta 2$	etc.
U.I. 1	+ .50	.0	− .23	+ .10	+1.80	
U.I. 16	+ .42	+ .10	− .09	+1.20	+ .60	
U.I. 17	.00	− .21	.00	− .90	− .50	
U.I. 18	− .21	+ .10	+ .60	+ .10	+ .50	
etc.						

Matrix B
Path-Record: Frequency and Potency Indices (Cultural Taxonomy and Ecology Theory)

	Test Groups or Individuals		
Paths	Normals (Mean)	Neurotics (Mean)	Case X
$\alpha 1$	0	− .40	+ .50
$\alpha 2$	0	− .10	+1.10
$\alpha 3$	0	+1.50	− .70
$\beta 1$	0	−1.60	+ .40
$\beta 2$	0	− .70	+ .30

Matrix C
Resulting Personality Deviation Indices

	Test Groups or Individuals		
Personality Factors	Normals	Neurotics	Case X
U.I. 1	0	−1.97	+ .99
U.I. 16	0	−2.65	+1.04
U.I. 17	0	+1.81	− .74
U.I. 18	0	+ .46	− .23
etc.			

would fit into the general matrices of Diagram 13–2. For this we will take the first formula of Diagram 13–2 and give it some actual, probable (but not experimental) figures, in Table 13–2.

Let us first return to the single specification equation above. At the right of the equation a row of path-personality coefficients (the numbers) has been multiplied by a corresponding series (row or column) of factor scores, each factor by its appropriate coefficient. The result sums to a single value, R. In matrix terms this means that a row of path-personality coefficients for a particular path experience, $\alpha 1$, is multiplied by a row of frequency coefficients, f_1, f_2, etc. for a particular person p_1. Repeat this for a whole series of paths, persons and frequencies and you have the matrix calculation shown in Diagram 13–2.

In the above computation, as Part 1 of Diagram 13–2 shows, there are three matrices—A, B, and C. The first, A, is the matrix of path-personality coefficients, for each personality factor. The second, B, is the matrix stating the frequencies with which various persons have tried these paths. They are path-association (APA Chart record) coefficients expressing frequency as a standard score. For example, if a person who follows path $\alpha 1$ about 78 per cent of the time (which is a standard score of 1.5 for the distribution of frequencies) turns out to be, on an average, .75 of a standard deviation above average in intelligence, then the regression coefficient in A is going to be $+0.50$. A person who follows $\alpha 1$, say, 56 per cent of the time, which corresponds to standard score (in frequency) of $+.40$, will then be estimated to stand at a level of $+.50 \times +.40 = +.20$ in standard score on intelligence. The product of A and B is a matrix, C, which estimates the resulting personality profiles of people who have had these experiences. Similarly the second part of Diagram 13–2 refers to the second objective in calculation referred to above, namely, inferring experience frequencies from a given personality.

Since knowledge of any two of these matrices permits calculation of the third, there are actually three possible uses. The first two are largely for applied psychology, calculating the characteristics or experiences of a particular person. The third has the more general and theoretical purpose of calculating and testing various hypotheses about the magnitude of path-personality coefficients. In the usage of applied psychology, the purpose is not only to deal with past experiences but also to determine the specific planned experiences which would produce a particular personality change.

As a scientific approach, the multivariate procedure just described has several of the characteristics and special advantages of factor analysis, which is also a matrix transformation. The matrix A is a more powerful provoker of hypotheses than are univariate findings. Conversely, when one possesses hypotheses and theories, it is a more powerful means of testing them, though, naturally, it differs from the statistical testing of hypotheses one at a time, on one variable at a time, to which many psychologists are principally accustomed. Illustration of the many ways it can be used, employing individuals or group mean values with which to enter the matrices, cannot be undertaken here. In the case of testing hypotheses which indicate differing values for several path-personality coefficients, one would prefer that which gave the smallest "least squares" deviation of the hypothesized A from the obtained mean A for a large number of people. The standard error of a path coefficient would be required to test the significance of an experimental result for a single value, and to obtain the latter one would require data for only one row and one column in the experimental matrices.

The general form of reasoning and experiment which applies to path-personality association coefficients applies also to the components which go into them, namely, path-choice coefficients and path-personality-transformation coefficients. Except for multivariate methods not yet fully discussed and requiring too much space for discussion here, the separation of these two types of coefficients would need to be achieved experimentally by appropriate specific control of the situation. First, one would need to obtain records of individuals at life-points when choice has been made but experience has not followed. For the second, one would need individuals with experiences of paths which, for some accidental reason, they did not actually choose. Life should provide enough of the latter, while the former might even be set up in the laboratory. However, most of the choices and experiences relevant to clinical personality data of this kind belong strictly to the natural life situation, and, in general, this is a field where group selection and refined multivariate analysis methods must replace simple laboratory control of conditions.

A number of additional, mutually consistent, possibilities of conceptualization and calculation can be developed from further applications of the above matrix treatment of adjustment-calculus. For example, when A is normalized by row, then $AA' = D$ produces, in D, a statement of the degrees of similarity of various factors in relation to their effects on the average person's life-record. When A is normalized by columns, $A'A = E$ makes E a statement of the similarity of adaptation paths in regard to their personality associates, and provides a basis for classifying them in types of paths. The derivatives of C similarly permit objective typing of the varieties of personality change.

This general theoretical development is mainly a plan for the future, in the sense that no coefficients are at present exactly known, and the precise forms, distributions, etc., of the various coefficients remain to be worked out. In particular, there are difficulties to be worked out regarding the nature of the product term when the path-transformation coefficient, which represents the change from a single experience, is multiplied by the path-frequency coefficient, since the result must take account of the non-linear relation between frequency of reward and learning increment. It will be noticed also that when we combine path-choice and path-transformation coefficients in a single path-personality coefficient as in Diagram 13–2, we are actually producing a product which combines personality levels (determining choice) with personality increments (resulting from experience).

Consequently Diagram 13–2 must be regarded as a general paradigm which actually needs working out more specifically in relation to particular purposes. Furthermore, it leads to, and requires more, analytical conceptual treatment. Principally, it must be adjusted to the fact that the emotional importance of the particular object or situation with respect to which one takes say, path $\beta 1$, needs to be introduced as a modifier in the calculation. The taxonomy of types of cultural situations to be introduced as particulars in the general adaptation paths, and the mode of combining these, and combining choice and transformation indices, therefore leaves many technical developments to be thoroughly thought out.

However, even immediately, the personality-path matrix calculations perform the service of reminding us that concepts and experiments in personality change have to be thought out in terms of multidimensional personality traits and an appreciable, but limited, and structured variety of adaptation paths. Furthermore, it reminds us that even with rough values and approximate technical formulation of the indices, we have a more comprehensive and practical means than any existing, for either routine discussion of individual clinical cases or for testing the reliability and validity of laws and theories emerging in the personality transformation area. For, as Gordon Hammer pointedly asks those who manifest any complacency about the present efforts of learning theorists in relation to personality (110, p. 75), "Are their efforts any more than ingenious attempts at the translation of what is already known or suspected into a particular set of terms? The present writer frankly doubts it." The whole development in this area, in terms of introducing integrative learning concepts and experimentally measuring learning effects on whole personality factors, is still to come, and the personality-path matrix offers a promising theoretical framework for handling such developments.

Examination of the Correspondence of Neurotic Process Hypotheses to the Empirical Findings

In principle, it is now proposed that, with the aid of the matrix formulation of personality deviation prediction just discussed, we examine the specific choice and transformation hypotheses regarding the neurotic process which we stated in detail in the preceding chapter, against the factual findings on the neurotic profile, as set out principally in Chapters 4 and 5. The hypotheses specifically stated in the preceding chapter, it will be recalled, concluded from the initial section of the Adjustment Process Analysis (APA) Chart, that higher levels on some personality factors would lead to, and others would arise from, a higher than average experience of encountering barriers and being unable to overcome them. Although this in itself is not neurosis, a higher proportion of frustrated (than unfrustrated) persons will, other things being equal, end in neurosis. Consequently, high frequency of experience along these paths and the personality factors associated with these paths will come to be statistically associated with neuroticism. We shall continue to call such non-neurotic but neuroticism-associated factors *neuroticism-contributing*.

After the alpha crossroads our theory supposed that other personality factors would, by their nature, similarly become associated with further experiences at the successive crossroads, e.g., that of internalized conflict rather than anti-social behavior; of repressive defenses, rather than suppression; and so on. These theories can be tested if we can calculate the directions and degrees of association with neuroticism that would be expected from our particularized hypotheses as depicted in Diagrams 12–1 and 12–2.

Leaving aside, for the time being, the question we have raised above about just what form the path-frequency coefficients should take, let us consider only the percentages of those meeting a given crossroads who pursue the different paths. If at crossroads X, 30 per cent of the population take the path X_1, which could lead ultimately to the neurosis, and 70 per cent the alternative X_2, which cannot, and the selection by choice raises the average person taking the X_1 path half a standard deviation on Factor A score above the X_2 choice group; then the ensuing differentiation of means of neurotics and normal groups on A will be different from that obtaining if the cut were, say, 50–50. That is to say, the calculation of the ultimately expected difference between neurotics and normals must take into account both the amount of the differentiation which occurs and the size of the fractions pursuing the alternative routes. Not all X_1 cases will proceed to neurosis, but at crossroads Y, a fraction, Y_1, will take the critical path and Y_2, the non-critical.

Incidentally, the Y_1 and Y_2 groups are likely to differ also significantly on some new factor, B, but our concern is with further differentiation on factor A. In general, if the percentages in the two parts, and the standard score difference of the two groups is the same, on a certain factor, at successive crossroads, the later crossroad differentiations will contribute more to the difference of neurotics and normals, for they are applied with greater exclusiveness to the group that is finally recognized as the neurotic group. No time will be taken here to work out the mathematics of successive fractionation which must ultimately be developed here.[2]

Fortunately, perhaps, our hypotheses in Diagrams 12–1 and 12–2 are not now stated in a form capable of employing anything so complicated. No one knows, at present, the percentages of the population representing the flow divisions at the various crossroads. In principle, however, this is what we are using, but by rougher methods, when we arrive, from Diagrams 12–1 and 12–2, at the expected association of various personality factors with neuroticism. For example, the differentiations on factor U.I. 16— at α and β crossroads, through lack of assertiveness disinclining to barrier attack, would not be expected to associate U.I. 16— at all so strongly with neuroticism as U.I. 28+ which operates with about the same differentiation at later crossroads (δ and ϵ).

At the same time, even though the reasoning from quantitative association to mode of connection has not yet been fully, explicitly worked out here, we must not omit certain allowances. For example, a certain factor, such as U.I. 16, associating at a certain moderate level, at each of three successive early crossroads, always in the same direction, could build up a statistical association as large as, or larger than, that of a factor operating at a crucial stage of the neurotic process, but once only. A possible psychological instance of this is that low intelligence, U.I. 1—, repeatedly favors drifting into early paths leading to barriers, and, still more, to the subsequent failure (as well as, perhaps, some actual decline on test performance due to rationalization and other upsets in the final neurotic condition); hence, it becomes statistically related to neuroticism almost at the neurotic process level. Conversely, U.I. 28, Rigid Superego, acts in the early stages probably in the direction of avoidance of situations likely to produce emotional conflict, but, once conflict is met, it operates to increase the severity of repression in the neurotic process itself. Perhaps, in any final comparison of neurotics and non-neurotics, we should expect it on the grounds of these conflicting directions to be statistically less associated than is intelligence. More exact treatment of the model, however, is necessary before this can be confirmed.

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[2] As an example of the additional considerations which must enter the final mathematical model, our subject (unlike Robert Frost's wanderer who "took one path in a yellow wood"—and would wonder all his life to what the other path led) has in many cases the chance to repeat. Later paths in some cases lead back to earlier ones. It is this kind of feedback which causes the involvement and suggests that our adequate treatment should be made at length elsewhere.

It may be of some interest to evaluate hypothetical expectations of association of personality factor levels with neurosis, from Diagrams 12–1 and 12–2, (a) in terms of degree of contribution at each crossroad separately, and (b) as a final association from the accumulation of the five successive segregations through the adjustment process crossroads. The upshot, in terms of a ranking of the degree of expected association of personality factors, from all causes, with neuroticism is (in declining order): 22−, 29−, 23−, 16−, 24+, 1−, 28+, 19−, 35+, 21−, 32+, 17+, 20+, 25−, 34+, 36−, and 33+. This agrees roughly with our actual empirical results on the relative contributions to neurosis of these objective test personality factors (see Table 5–1). It is, of course, not claimed that this is in any strict sense an empirical confirmation of hypothetical deductions from the adjustment process analysis model, since the hypothetical predictions were made with some knowledge of empirical results.[3] The main value of presenting hypothetically-expected associations, at each crossroads and in terms of total degree of associations through all crossroads, is (a) to evolve predictions against which data on larger samples can be checked (b) to suggest testable hypotheses about the relative stage of the neurotic process at which various factors have their most important effects. (See research proposals, pp. 374 ff.) For example, the adjustment process analysis theorizing (Diagrams 12–1 and 12–2) brings out, hypothetically, what is too seldom recognized in clinical discussions of neurosis (which begin typically with crossroads δ through Z), namely, that cognitive and dynamic inabilities to solve problems (low intelligence and Lack of Assertiveness) and temperamental tendencies to withdraw and to lack resources (Inhibition, Resignation, Low Exuberance) are associated with the first steps to neurosis. That is, their known overall empirical association with neurosis stems from involvement at a different stage of the neurotic developmental process than does the overall empirical association of other factors. Experiment on the life-course of factors (p. 375) should be illuminating here.

What has been said above about hypothetical predictions from the Adjustment Process Analysis (APA) Chart, also applies to the more massive second-order personality factors. Perhaps we should repeat

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[3] Cattell first made the APA Chart hypothetical predictions of association in 1957, prior to collection of data from the R6, R9-Ta, R9-Tb, and R10 studies in Table 5–1. His predictions were then modified and corrected with knowledge of empirical data from half the N in the R9-Ta sample. They were allowed to stand thereafter without further modification in the light of the main empirical data.

(since those unfamiliar with the statistics of factor and pattern analysis are sometimes confused regarding the logical status of factor concepts of different orders), that first- and second-order factors offer alternative but not conflicting resolutions. It is as if one said, on the one hand, that a village is composed of individuals, and, on the other, that it is composed of families. Description in terms of the latter, corresponding to second-order factors here, gives the same population to the village, with some loss of detail, but also with some added structure. The first-order treatment is the more important one, for, in terms of our analogy, the second-order, although providing more description of what a family does or represents, does not fully account for what the various individuals do or represent.

However, as the experimentally newer, more precisely structured, factor-analytic, measured results of personality described here are increasingly brought alongside older concepts, derived from clinical observation and pre-metric inference, it is often noticed that the concepts which develop under the clinician's eye tend to correspond to broader second-order, rather than to the more analytic first-order concepts. For example, such old clinical friends as general intelligence, anxiety, and extraversion are ultimately second-order factors, in that the former breaks down into the Thurstone first-order factors and the latter two into our first-order questionnaire factors (see Table 4–3). It is historically interesting that Jung was not quite satisfied with the single extraversion factor, dimly perceiving clinically the operation of what we now clearly recognize as finer primaries, beneath the surface of the general behavioral form of extraversion. Our general expectation would be also that the general adjustment concepts that enter most frequently into pre-metric clinical discussion would be more likely to find their substantiation at the second-order rather than the first-order level.

The recently demonstrated, but as yet insufficiently checked, second-order personality structure among *T* data primaries (Table 5–2) turns out to be extremely meaningful. Nevertheless, the interpretive labels (customarily following the second-order factor Roman numeral index) must be taken as tentative until researchers have supplied supplementary evidence on their life-courses, clinical and other criterion associations, and genetic origins. Consequently, we have referred to F(T)I with maximum descriptiveness as Tied Socialization or Superego Development and to F(T)II as Expansive Ego *vs.* History of Difficulty in (Emotional) Problem-Solving, but many clinicians may recognize these broad patterns as what they have long called superego and ego strength, and prefer to call them so.

Regardless of verbal labels, we have in Chapter 12 already worked out hypothetical conclusions for these as for the primary factors. They are based on the patterns of these factors as demonstrated, in terms of the miniature situation test behavior known to be associated with them. These hypotheses associate Ego Weakness, F(T)II−, with paths of failure in the β external problem-solving stage and Superego Strength, F(T)I+, with the pattern of primaries operating at $\gamma 3$; that is, in the interest of resort to the path of renunciation. Additionally, Temperamental Ardor, F(T)III+, was argued to be associated with high frequency of encountering barriers at $\alpha 3$; History of Inhibition, F(T)V, with $\alpha 4$; and Narcistic Development, F(T)VI+, with $\beta 5$ and $\delta 2$. In summary, the rank-order of expected association from the APA Chart is generally well confirmed by empirical results, the comments on first-order results applying here as well (*q.v.*).

Ultimately, as these second-orders come in for the intensive research they deserve, these findings will permit considerable theoretical development. It is clear that in the main effects of Ego, Superego and Temperamental Ardor (the last might be interpreted as demandingness of the id) they fit classical, psychoanalytic theory well, but the remaining findings also deserve consideration. However, apart from theory, since these factors can now be tolerably measured, they can aid in diagnosis, especially in separating the acting out from the true neuroses, by the emphatic differences of pattern on History of Inhibition, F(T)V, and Narcistic Development F(T)VI (see Table 5–3). The differences of these two groups should also have much relevance to differentiating the development of delinquents and neurotics. As Burt long ago brought out, and the observations of Hammer (110) and Rose (187) recently confirm, normals tend to fall between neurotics and delinquents on certain personality tests, which probably load on Inhibition (U.I. 17); Subduedness (U.I. 19); Wary Realism (U.I. 31); Introversion (U.I. 32). This is by and large consistent with the main difference actually falling on F(T)V; that is, normals are significantly more Inhibited, Introverted, etc., than delinquents, but significantly less so than neurotics.

The Chief Present Developments Beyond Pre-Metric Theory and an Examination of Long-Circuiting and Deflection Strain

Our purpose in glancing back at pre-metric clinical and anthropological theories, both in their classical form and in terms of our own special developments in Chapter 2, is to ask how much can be substantiated and at the same time to bring out the special character of the new findings and developments.

It is clear that the findings fit some of the main contentions of pre-metric theory, particularly as to (a) the importance of instinctual frustration, (b) the ensuing introduction of repression, at early and at later stages, as a cause and later as a consequence of defective ego development, (c) the role of the cultural pattern in terms of the severity of its inhibition of more direct instinctual expression, specifically in the period of early childhood, and (d) the rise of symptoms from drive regression and compromise expressions of id and superego expressions. Indeed, we find second-order factors, tolerably fitting and substantiating the concepts of ego F(T)II and superego F(T)I structures, which arise or are at least strengthened by happenings in the adjustive process, just as was previously clinically conceived. Additionally, we have defects of development of the self peculiar to the sociopathic deviant.

Beyond this substantial area of confirmation, however, our theory develops differently, in ways which are briefly listed first and later discussed. In this listing we propose to go far back into the accumulating evidence in the present book, not merely to the last portion. Our conclusions differing from the classical clinical position are:

1. We find a greater role for constitutional or hereditary influences than the clinical, individual "dynamic" analyses of neurosis have commonly done.
2. We ascribe more environmental variance to family atmospheres or educational training systems than to purely individual trauma and historical accidents in early childhood.
3. We re-structure certain dynamic, economic, clinical concepts, notably of cognitive dynamic investment strain or long-circuiting, of deflection strain or sublimation, and of bound anxiety, chiefly by finding not one but several forms of bound anxiety.
4. We emphasize that the traits of the neurotic personality are associated not only with the particular outcomes of an internal conflict, but also with the preliminary history of external conflict with barriers. (For we find personality factors operative at this external adjustment stage to be empirically associated with final neurosis.)
5. We find neurosis involves a complex pattern of personality-factor deviations (as contrasted with Eysenck's single-factor theory, or the frequent clinical view that neurosis is largely a form of high anxiety, or the psychoanalytic view that it is entirely accounted for in terms of id, ego and superego dynamics).
6. We regard neurosis as differing markedly from psychosis. It should be recalled that virtually no systematic difference of pattern has yet been demonstrated between psychotics and normals. All kinds of personalities can lose reality contact, and presumably psychotics will differ on a reality contact dimension. But neurotics differ systematically from normals in general personality pattern, so that neurosis may indeed be regarded as a special type of personality pattern.
7. We show that environmental "stress" does not necessarily, or even generally, increase neuroticism and anxiety. It often increases the states of Effort Stress (P.U.I. 4) and Pathemia (P.U.I. 2) but is

uncertain in effects on Anxiety, and typically reduces regressive phenomena (U.I. 23) and other neurotic traits.

8. Above all, this approach differs in defining the factors experimentally, and in providing test batteries to measure their strength (Chap. 15).
9. We have developed an adjustment process matrix-calculus whereby personality and path-frequency measurements can be used to elucidate the history of the individual case and to guide the tactics of therapy.

As to the first of these points, it has been shown that intelligence (U.I. 1), Inhibition (U.I. 17+), Promethean Will (U.I. 19+), Comention (U.I. 20+), Exuberance (U.I. 21+) and High Mobilization (U.I. 23+) have appreciable hereditary determination. See Eysenck and Prell (89), and Cattell, Stice and Kristy (72), with references cited in these articles. The latter study is the most extensive study yet recorded on measured personality inheritance, covering some five hundred subjects (e.g., identical and fraternal twins, siblings reared apart, unrelated children reared together) in the multiple abstract variance analysis design (36). There is also evidence of substantial inheritance of Invia-Exvia (U.I. 32), presumably through the A+ (Cyclothymia) and H+ (Parmia) primaries which Cattell, Blewett, and Beloff (52) have shown to have major hereditary determination (though the F+, Surgency, component they found largely environmental).

These pre-existing, constitutional factors presumably act not at one but at several paths in the adjustment process analysis chart, notably in multiplying the perception of barriers, in causing failure to break or negotiate them, in predisposing to withdrawal from problem-solving, in treating the renounced drive repressively, and in producing a lack of that surplus energy which in other cases would postpone the appearance of some neurotic symptoms. The most unusual of these additions, from the standpoint of existing clinical theory, is the indication that the very tendency to conform by repression, Comention (U.I. 20+), has its individual differences substantially determined by heredity. Obviously, the implication of these findings for therapy is that a more thorough study of the individual's general personality endowments is necessary before the points of best application of remedial measures can be decided.

To continue our discussion: as to the second point above, the importance of family environment, the examination of within-family and between-family sources of environmental variance (in the environment and heredity experiments mentioned above, 52, 72) shows that two of the central neurotic-process factors, U.I. 16− and 22−, which are largely environmental and associated with neurosis at the $P < .01$ (and possibly, U.I. 28, at the $P = .05$) level, have their variance determined more by variations between families than by individual accidental or positional effects within families. Indeed, the nature of U.I. 16+ (which may be the core of McClelland's "achievement from insecurity") definitely suggests a mode of upbringing involving an earlier and more total delegation both of freedom and responsibility to the child. It corresponds, in presently known family attitude dimensions, to Baldwin's "nonchalance" (7, 8) and is opposite to Symonds' indulgent-overprotective-dominating set of attitudes (211). From the association of the latter concept with neurosis we make no superficial value judgment on these attitudes in regard to wider cultural purposes. For Symonds' results suggest that "nonchalance" may hide some lack of affection and parental guidance, and, as soon as it passes moderate limits, becomes more frequently associated with delinquency in the child. This fits also the distribution of inhibition just discussed in connection with Rose's (187) finding (that normality lies between neurotic and delinquent poles of self-expression) and as discussed further below.

In discussing these family atmosphere influences, the experimental psychologist is today under the disadvantage that, apart from the pioneer studies of Baldwin (7, 8), Cattell and Cabot (54) and what may arise from the recent work of Becker, Peterson and their co-workers (13, 173), no investigators have seriously set out to determine the dimensions of family attitudes and atmospheres. A comprehensive factoring of some hundreds of behavioral variables, of the kind gathered by Cattell and Cabot (54) in the Cambridge Youth Study, has long been overdue. At present, therefore, apart from the Baldwin "nonchalance" dimension, certain dimensions are only inferred from the fact that we discover a dimension of personality which has a high environmental determination, especially in terms of between-family environmental variance, and has other hallmarks of an environmental mold factor. For safety, we shall not give names to these inferred family dimensions, but speak of a U.I. 22 or Pathemia-generating family atmosphere (and similarly for U.I. 16, 18, 24, 25, etc.), leaving to family research the suggestion that these dimensions are the predicted important ones to be found independently, as a lock suggests a key.

Among liberal educationists today, the value judgment would probably be made that the U.I. 22, Corticalertia-generating family atmosphere is the desirable one. It is based on the serene philosophy that to every problem there is a solution if one will think objectively and handle it in explicit cooperation with others. At the opposite pole lies a muddled emotionality, either through frustration-depression, or through some general atmosphere of treating problems at a feeling level, rather than an explicit cognitive level (whether feeling predominance is the cause of frustration or vice versa cannot be confidently decided at present, but the latter is probable). Thus, those low in U.I. 22 are brought up in families where it is more usual to encounter many difficulties, to smolder emotionally over problems, to evade realistic life demands, and to react by feeling rather than by reason. However, the atmosphere of greater emotionality may have its virtues in other directions. Although it produces more opportunities for frustration, and although emotionality of response to frustration is in some senses a more childish way of reacting to frustrations, the possibility must be considered that it may correspond to an emotionally richer, sentimental, or poetic experiencing of life. U.I. 22+, Corticalertia, though it represents an objective, optimistic but realistic acceptance of limitations also perhaps implies an over-alert reactivity to external demands, at the expense of inner emotional life. One suspects that the family atmosphere in New York City suburbs and in Hindu villages would be at the positive and negative poles of this dimension.

Apart from impressionistic contributions by anthropologists and such psychoanalytic writers as Fenichel (91), Fromm (99), and Horney (119), psychoanalysis has contributed little regarding the effect and nature of family attitudes upon neurosis. However, some good experimental, or at least empirical, attacks have been made by such psychologists as Baldwin (7, 8), Becker *et al.* (13), Hewitt and Jenkins (115), Mark (149), Peterson *et al.* (173), Plank (175), and Shoben (201). Unfortunately, as we have just pointed out, what these experimental studies still lack (presumably because of the organizational difficulties in so comprehensive a research project), is a conclusive factor analysis of family dimensions, that is, of objectively measured attitude and (time-sampled) atmosphere variables describing family life and its interactions. Only when this has been done can one economically and meaningfully attack the analysis of effects of atmosphere on personality in terms of precise, replicable personality and family dimensions, to check such hypotheses as those we have stated above regarding the genesis of U.I. 16 and U.I. 22.

Parenthetically, it is almost certainly a mistake to assume that the real family dimensions will correspond to the simple, a priori, logically, psychologically, or culturally recognizable concepts with which all too many investigators are satisfied to proceed—and which are seldom the same from one investigator to another. The dimensions will probably be emotionally composite and behaviorally complex. For it is beyond our present powers to understand, historically or dynamically, why certain things, in so complexly determined an entity as the family, should go together. In our discussion of research needs below we shall argue that the chief present requirement is not theorizing but a more exact determination of dimensions of the family mold, and of the personality coin that is cast from it. For example, it could be that the greater part of these differences in family education is quite unconscious and handed on by unspoken tradition. At the same time, other atmospheres may be as consciously and egregiously applied such as the tenets of Victorianism in 1860 or Progressive Education in 1960.

Regardless of what their ultimate nature may prove to be, our present contribution brings family atmosphere dimensions to a previously unrecognized importance in the etiology of neurosis and provides measures of personality change by which this new theoretical emphasis can be checked. Where a personality factor is largely determined by environment, as with U.I. 16 Harric Assertiveness, U.I. 22 Corticalertia, and Surgency-Desurgency (F), a relation approaching a one-to-one alignment between the environmentally molded pattern in the individual and the attitude dimension in the family is a probability.

Finally, in considering advances beyond those of pre-metric method, we come, in environmental concepts, to influences too broad for single family influences, and which presumably lie more in broad differences of cultures and sub-cultures. Nowadays it is possible, as shown in Chapter 11, to express broad culture pattern differences in unitary dimensions, proved to extend over some seventy national cultures, and these relate, conceptually at least, to such concepts in individual experience as long-circuiting strain and deflection strain. The former defines the amount of attitude subsidiation which the individual is compelled to sustain in reaching his ergic goals (33). The latter refers to the degree of change enforced upon the goals themselves, as in sublimation and perversion. These concepts have been developed by Cattell in connection with general dynamics (33, 44) and might be found to have decided relations to neurosis.

The immediate question is whether the metric advances enable us to substantiate these concepts and, if so, whether they have relations to neurosis. At the *Q* data level, one factor, F—, Desurgency, is at once recognizable as having decided resemblance to long-circuiting. It represents the total punishingness of experience, being greater, for example, in children brought up in less privileged environments. In *T* data factors, several strike one as relevant, namely, U.I. 35, which in fact has been called Long-circuiting; U.I. 25, Eager Subjectivity, which has a possible interpretation as Imaginative Tension due to ergs being deflected from their natural goals and seeking expression in any possible direction, and U.I. 21, Exuberance, as lack of long-circuiting. Furthermore, one must consider the second-order level, where Temperamental Ardor *vs.* Sublimatory Capacity F(T)III, Educated Self-Consciousness *vs.* Unrealism of Self-Sentiment F(T)IV, and Tension to Achieve F(T)VII have claims to consideration. Finally, one must consider that primaries concerned with frustration, notably U.I. 16−, 18+, 22−, 24+, etc., would be expected to show correlation with the factors expressing these concepts, since the latter are offspring of frustration.

No confident identification can be made at the present time because the above factors need sharper definition and also because, on general psychological grounds, one would expect two pairs of factors instead of two factors. The characteristics of depression (or soberness), neuresthenic fatigue, freedom from impulsiveness, high degree of integration, etc., which go with the concept of a high degree of long-circuiting might be expected to be partly a function of (a) the high level of cultural demands in the particular sub-culture, and (b) a constitutional capacity to go a long way in terms of acquiring and sustaining such long-circuiting. Consequently, among the factors considered, we eventually must settle on four, not two. Our main hypothesis at the moment is that these four concepts will be found among the six or seven empirically defined factors listed above, and our more specific hypotheses as to which is which are decidedly more tentative.

One of the necessary first steps to clarifying the situation is a nature-nurture ratio determination, to discover the member of each pair which is the constitutional contribution. Tentatively we shall hypothesize F−, Desurgency, to represent the environmental contribution to long-circuiting, and, as the theory would indicate, this is significantly associated with neurosis. In the *T* data realm we would consider the second-order factors to represent the concepts better. Therein, Ego Strength, F(T)II+, and History of Inhibiting, Restraining Environment F(T)V, suggest respectively the personal tolerance limits and the environmental demand limits in the achieved long-circuiting level, while sublimatory capacity, F(T)III−, and Tension to Achieve, F(T)VII, represent respectively a constitutional effect and an environmental demand effect regarding degree of ergic goal deflection sustained. The primaries mentioned above are included in these second-orders. The relations of these factors to neurosis, as Table 5–3 shows, is mainly as would be theoretically expected. This analysis has special interest as giving substance to two pre-metric concepts not in the classical clinical system itself.

On looking back on this and the preceding section's conclusions regarding the correspondence of pre– and post-metric concepts, we see a substantial fit with both some under– and over-shooting of the pre-metric concepts. In regard to the differences, listed at the opening of this section, we should next call attention to the systematic changes in conception in point 4 above (p. 353), importance of earlier historical phases, and point 5, the importance of more than one or two specifically neurotic factors. It has already been made clear in discussing neuroticism-contributing as distinct from neurotic process factors that we consider classical theory too confined to the latter and failing to give weight (especially in statistical terms) to the preliminary barrier experiences and responses. Also, we recognize that these experiences have their severity determined partly by environmental circumstances, but also substantially by such pre-conditions as ergic rigidity, low intelligence, and defective educational habits in the individual. Here too, we suppose not one dramatic, infantile, sexual traumatic experience, such as is shown in oral or genital fixation, but a cumulative effect on the total personality from the operation of these barrier-creating factors on countless, varied, ergic frustration situations, not necessarily sexual. Only in the case of the Rigid Superego (U.I. 28+) pattern is the coincidence of frustration with a libidinal maturation stage indicated.

The point that neurosis is not change in a single dimension of neurotic trait development but a complex outcome of multi-dimensional deviations in personality has clear supporting evidence. Some of the demonstrated factors (Tables 4–2, 5–1, 5–3) concern the incidence and mode of reaction to early frustrations, others are describable as factors of ego strength and constitutional repressiveness, and some again are interpretable as regression and exhaustion. There is no possibility of resolving in terms of some single factor of regression, as in psychoanalytic views, nor of some largely constitutional neuroticism factor, as in Eysenck's view (86, 89). Nor, in second-order terms, can it be resolved entirely into a purely dynamic outcome, concerned with anxiety from an id, ego and superego conflict, as in psychoanalysis. A dynamic situation precisely along the lines of the Freudian explanation can be supported, it is true, by our results, showing, in the second-order realm, that neurotics are low on the ego strength of F(T)II and high on superego strength F(T)I. If one wishes to see the full support possible for the Freudian picture, he can even consider the possibility of interpreting Ardor, F(T)III+, as a measure of id demand strength. But even so, there remain significant associations with other factors, notably History of Inhibiting Environment F(T)V for true neurotics, and Unrealism of Self-Sentiment F(T)IV— and Narcistic Development F(T)VI+ for sociopaths, which go well beyond the framework of the psychoanalytic explanation. Especially, the explanation of the final stages of the neurotic process goes beyond the psychoanalytic theory by introducing several distinct exhaustion or energy economic influences limiting the individual's capacity to adapt; for example, U.I. 21 and 29, which are roughly of the same order of importance as dynamic structure factors in deciding whether a neurosis shall be the final outcome of certain frustrating situations.

Integration of Recent Advances in the Dynamic Calculus with the Present Theoretical Development

From the material in the preceding section it will be evident that although our conclusions are reconcilable with the major role given to the conflict of dynamic structures in older clinical theory—and indeed provide the first experimental support involving definitely measured ego and superego structures—there remain important differences. Our systematic position goes beyond current clinical theories in giving a greater role to various constitutional limitations in the individual and to the stages in conflict prior to internalization. It also considers the particular trauma and conflicts to be less important in and of themselves and more important in terms of the changes they bring about in more general personality structures and dimensions.

However, it may well be true that when one turns from diagnosis to therapy the only way to restore these abnormal general dimensions to normal values is through the unraveling of the particular dynamic conflicts. Even if one grants this, as beyond evidence from our present researches, one could still contend that the unraveling process itself, which is a mixture of continuing diagnosis and treatment, needs to be done (a) with greater regard for the constitutional resources of the given individual, and (b) with more reliable instruments for dynamic investigation. Adjustment to limits and resources of the given personality—such as the carpenter makes to the nature and grain of the wood—will be illustrated in Chapter 14 on proposed clinical research and practice, but in regard to dynamic investigation there are recent advances requiring fuller treatment in the present chapter. However, before leaving the theme of the importance of the individual's given temperamental and ability resources, let it be placed in perspective by the observation that the clinician, in traditional practice, is usually ready to admit that an identical stress and conflict of ergic needs in two different patients may produce negligible pathology in a person of a particular constitution and cultural background, while provoking severe neurosis in another. The truth is, surely, that the habit of styling the dynamic tangle as *the* cause of neurosis, and of concentrating exclusively on its unraveling, has grown up because this is the only thing the clinician believes he can do anything about. This assumption is not necessarily true, and, unfortunately, concentrating upon dynamic unraveling does not always remove the neurosis——as, indeed, would be expected if it were *not* the sole cause.

Nevertheless, the dynamic re-education is probably extremely important and should be well performed with the same quantitative aids as have proved useful in general personality investigation. At this point, therefore, we must introduce a whole new experimental development which has been called the Dynamic Calculus. It has hitherto played no part in the systematic investigation of neurotics as described in this book, but now becomes inescapably relevant and will be introduced by accounts of a special series of subsidiary experiments. Among those unfamiliar with multivariate research potentialities the remark is sometimes heard that "Factors are not 'dynamic,' but remain 'static' entities." This shows a fundamental misunderstanding of the necessary sequences in scientific research, compounded with a confusion of the physicist's and psychologist's definition of dynamic. Physically, dynamic analyses proceed by calculations on bodies perceived at certain positions at certain times. A movie would be impossible if one could not photograph entities at momentary positions of rest. Similarly, if one does not first work out techniques to fix personality factor structure at a given cross-sectional moment and thus measure *initially* static factors, it is not possible to perform experiments to determine dynamic laws of change. Thus, factors are not static in the first sense; they are measured statically because this is the only way reliably to study change. But they are also not static in the second sense, for psychologically dynamic data—interests, drives, attitudes, desires—can be structured factor analytically just like temperament or ability measures.

The application of factor analysis to purely dynamic variables has been more recent and has therefore produced less complete results than the above applications to general personality factors. A few of the factors in general personality data, almost by accident, may turn out to be purely dynamic factors. In the sense of a general dynamic structure, unrestricted to particular dynamic needs, such factors as Ego Strength F(T)II, Superego Strength F(T)I, Regression U.I. 23−, Anxiety U.I. 24, and the *Q* data factor, Dominance E+, may be called dynamic factors.

The developmental history of such abstracted, broad, dynamic factors—abstracted from particular dynamic attachments and experiences—is nevertheless, almost certainly, one of cumulative effects of particular conflicts, resolutions, interest investments. Presumably, also, the level on such factors can be modified by manipulating, undoing and re-learning with respect to particular memories of conflict and fixation. Factor measurement is primarily a diagnostic device and one operating on the broader structures. It leaves to more detailed dynamic analysis the influencing of these structures.

However, the developments in specifically dynamic factors now to be described permit quantitative aid and insight even with the specific dynamic traits. To discuss the results clearly it is necessary to be reminded of the earlier definitions of common and unique, general and specific, R-technique and P-technique factors and loadings. R-technique is capable only of revealing common traits—patterns of psychological organs common to everyone—and it depicts the mean pattern. For unique trait structure, as it concerns, for example, the particular interest attachments, the idiosyncratic fixations and personal history of objects of conflict in the life of the individual, we have to resort to P-technique (the quantitative equivalent of clinical free-associative techniques). Actually, free association, dream analysis, etc., pursued day after day, constitute, methodologically, a rough form of P-technique in which the therapist's memory and intuition, rather than computer recording and calculation, establish the connection. Properly pursued, as described below, P-technique with dynamic interest measures is thus in principle capable of the same clarification of truly unique dynamics as are the clinician's present individual methods.

Before proceeding to dynamic P-technique, one possibility of misunderstanding should be cleared from the track. Our previous use of P-technique, in Chapters 9 and 10, was ultimately not directed to what is unique but to what is common in states. To discover the greatest common measure in anxiety as a state, we laid P-technique studies of the same variables, from several people, side by side. Our present use is different in that no averaging of individuals is intended and the unique features of the individual patterns are studied for their own importance.

Moreover, before P-technique studies were undertaken, the realm of dynamic traits was explored and structured by a comprehensive R-technique analysis of purely dynamic behavior manifestations (50, 56, 61). This structuring of a wide array of objective measures of interest and motivation attachments revealed some nine distinct ergic-drive patterns (sex, fear, self-assertion, curiosity, etc.) and five or six acquired sentiments, i.e., learnt dynamic structures, such as the superego, the self-sentiment, sentiment toward career, toward home, toward religion, etc. Presumably, the previous general objective tests, leading to our general personality factors, had hit on only some of these, notably, the superego and ego structures. As far as can be determined at present, none of the nine drives (ergs) had been measured in pure form among general personality tests and factors.

The clinician's request for more psychometric help with regard to the dynamics in which he is interested can therefore now be met by (a) measures concentrating on the discovered purely dynamic factors, ergs and sentiments, which are common factors, demonstrable by R-technique, as individual differences of level; (b) a supplementation of the common trait approach through examining these same dynamic factors by P-technique, which can reveal the individual dynamic conflicts and attachments. Additionally, the clinician keenly interested in the full possibilities of dynamic measurement should be reminded, as above, that certain common dynamic structures are already included in the general personality factors already described. Possibly, at the risk of repetition, one should also call attention to the implication above that the dynamics of the patient's present maladjustment and the resources that determine his possibilities of readjustment lie partly in the fixed temperament and ability traits.

Unfortunately, for the full exploitation of this basic research in the clinical field, confirmed structure and, therefore proven concept-valid batteries did not exist for the purely dynamic R-technique factors at the time the present research was begun, while the development of the P-technique treatment of conflict is extremely recent. Despite its great promise and importance, therefore, this supplementation of our approach through general personality factors must be tentative and brief. A rather complete summary, in the space of three chapters, of the factual and theoretical developments in objective, motivation measurement has recently been given elsewhere (see 44. Chaps. 11, 12, 13), but the essentials can be tersely listed here:

1. Objective devices, that is, more than opinionnaire, self-evaluative statements, for measuring the strength of any specific motive or interest attachment, have been discovered. This work reveals that by grouping the devices according to motivation component factors, the ego, id, and superego components can be recognized and separately measured in any specific interest.
2. Drives and acquired sentiment patterns, such as the self-sentiment (attitudes and interests centering on the self concept), can be isolated by factor analyses of a sufficiency of specific interest attachments, measured as in (1.) above. The ergs (as they are termed, to avoid the ambiguities of instinct) among these factors correspond to drives and instincts as clinically and biologically recognized (sex, fear, gregariousness, aggression, etc.).
3. The fact that it now becomes possible to measure the tension level of any particular erg in any particular situation, by adding scores on a collection of variables known to be highly loaded in that ergic factor, permits all kinds of dynamic calculations to be made.
4. The theoretical inference can now be made that the amount of conflict involved in any particular attitude or course of action is measurable by the conflicting weights of the various ergs in the specification equation for that interest. If we represent the strength of interest in the course of action defined by a particular attitude as I, then knowing the loadings of this interest on the ergic contributors, E_1, E_2, E_3, etc., we can predict this strength of interest by inserting the individual's particular ergic tension levels (E_{1i}, E_{2i}, etc.) in the

equation following. (See Chaps. 11, 12, 13 in 44 for fuller explanation of derivation of formulae and psychological conclusions.)

$$I_1 = .4E_1 + .3E_2 - .1E_3 + .2E_4$$

Only a fifth of the ergic drive in this attitude is involved in conflict. (The arithmetic, sign-free, total of the loadings is 1.00 but their algebraic total is .80. The E values are held constant and equal, because this is a statement about an attitude in people in general.) On the other hand, in

$$I_2 = .5E_1 - .2E_2 - .2E_3 + .1E_4$$

four-fifths is cancelled in conflict. $\left(.1 + .2 + .2 + .5 = 1.0;\ .1 - .2 - .2 + .5 = 0.2;\ 1.0 - 0.2 = 0.8;\ \frac{0.8}{1.0} = \frac{4}{5} \right)$

The rationale of this index is simple enough, being the age-old clinical view of conflict that if drive A opposes drive B and gains expression despite the conflict, then as much of drive A as is necessary to overcome B is tied up in this cathexis, that is, is cancelled and unable to gain expression. The novelty consists in being able, through substantive studies, to identify and measure the drives that need to be entered in the above equation. By this capacity to measure, the index of conflict and its associated concepts can be put to the test.

5. By individual, P-technique factorization, it now becomes possible to determine the specification equation, no longer just for people in general, but for the particular interests and symptoms of individuals.

Indeed, as reading elsewhere (44) will more fully illustrate, the clinical use of P-technique factoring of the individual patient can provide: (a) an objective, impersonal indication of the principal areas of conflict; (b) a quantitative statement of what ergs (drives) enter into what conflicts, and (c) a possibility of assessing, objectively, the total degree of conflict sustained by the given individual (relative to the average person) by the conflicting projections in a single index:

$$C = \frac{\sum_{s} (-)^2}{\sum_{s} (+)^2}$$

providing they are taken for a set of attitudes truly representative of the total life interests.

This theoretical proposition by Cattell (44, Chap. 13) has recently been put to the test of experiment by Williams (223). Williams measured six normals and six mental hospital patients, each over 40 occasions, on objective tests of fourteen representative, important attitudes, covering the ergs of sex, assertion, protectiveness, fear, and gregariousness, as well as the strength of the self-sentiment. The factorially calculated index of conflict, C in the equation above, was (a) at a significantly higher mean level for patients than normals, (b) significantly and positively correlated with psychiatrists' ratings of degree of conflict, regardless of subjects being patients or non-patients, (c) significantly and positively correlated with Ego Weakness (factor C—) and those other factors of the 16 P.F. (62) which are concerned with conflict. These results are set out in more detail in Table 13–3.

We should expect this index of conflict (C index, or, to be more precise, its numerator) to express the total amount of drive energy tied down in internal conflict, and as such, to correspond to frequency and degree of traversing those paths which end in the Z crossroads. Indeed, we should find here one of the first bridges from the study of particular conflicts, with which the clinician is concerned, to the measurement of major personality factors. For the C index abstracts from the conflict a general level of conflict, a dimension of the total personality, and this dimension should gradually change as the clinician resolves now this, and now that, ramification of the conflict. In searching, theoretically, for some already familiar general personality factor with which C should align itself, we ought, probably, to reject F(T)I+, the Superego, and F(T)II+, the Ego Strength dimensions. U.I. 24, Anxiety, has the next claim as conceptually proximate, yet unexpressed drive is not absolutely synonymous with Anxiety. For as the crossroads show, Anxiety is not the only outcome of denial; there is produced, also, Imaginative Tension (Eager Subjectivity), U.I. 25—; Rigid Superego, U.I. 28+; Low Adaptation Energy, U.I. 29—, and several others.

Unfortunately, Williams' subjects were not tested with general personality objective tests, but only with the questionnaires, which tend to parallel, in their second-order, only four of the objective test first-order factors, so these connections generally cannot be assessed. The overlap of conflict total and Anxiety total should, however, be considerable. Accordingly, we tested the hypothesis by scoring Anxiety as the second-order *Q* factor in the questionnaire. As seen in Table 13–3 we obtain significant, positive correlation of Anxiety with the C index of ergic conflict, but the magnitude, $r = +.29$ or $+.49$, according to mode of assessment, agrees with our expectation that conflict would not be entirely synonymous with Anxiety.

The exact alignment of a particular conception in R-technique factors with the C index is therefore a vital matter for present research. But there can be little doubt that we stand at the threshold of an integration of the dynamic and the general personality realms of measurement, in which the clinician will be able to link his customary thinking on specific drive and sentiment conflicts, as made accessible here by

TABLE 13–3

MEAN INDIVIDUAL "INDICES OF CONFLICT AMONG DRIVES," C, FACTORIALLY MEASURED, COMPARED WITH CLINICAL AND OTHER CRITERION MEASURES OF CONFLICT

	Statistical Relationship	Statistical Significance of Relation
Difference of 6 normals from 6 mental hospital patients on Conflict Index, C	Mann-Whitney Test Patients higher U = 3	$P < .01$
Correlation of *psychiatric ratings* of total conflict with C	Pearson r = .32	$P < .01$
Correlation of *Ego Weakness* (as measured by 16 P.F. questionnaire factor C−) with C	r = .25	not significant
Correlation of *Ego Weakness*, C−, with absolute amount of conflict ($C' = \Sigma \overset{(-)}{s}^2$)	r = .37	$P < .01$
Correlation of *Ergic Tension* (as measured by 16 P.F. questionnaire factor Q_4) with C	r = .42	$P < .01$
Correlation of *conflict with environment* (rated from life-history) with C	r = .18 to .28	not significant
Correlation of *Anxiety*, (as measured by 16 P.F. questionnaire second-order factor F(Q)II) with C	r = .29 to .49	$P < .01$

The conflict index, C, is calculated here not as an absolute value, $\Sigma \overset{(-)}{s}^2$ (except with row four above), but as the ergic strength absorbed in conflict divided by the individual's total ergic strength, i.e., as the square of the negative loadings for all ergs on the given representative set of attitudes divided by the square of the positive loadings of all ergs on all attitudes, which may be represented as

$$C = \frac{\Sigma \frac{(-)^2}{s}}{\Sigma \frac{(+)^2}{s}}$$

In the three-cornered relationship of conflict index, presence of hospitalization and psychiatric rating of degree of conflict, we have set out in detail only two sides of the triangle, but the relation along the third is entirely consistent, for ratings and hospitalization are positively correlated.

Data are from J. R. Williams (223).

dynamic P-technique analysis of individuals, with the more abstracted general personality factors with which we have dealt through most of this book. For example, among the suggestive results already evident (summarized in 44, Table 12–13, p. 527) is the finding that the questionnaire personality factor Q_3 (Strength of Self-Sentiment) is significantly and substantially correlated, as its title would lead one to expect, with the purely *dynamic* (R-technique) structure factors recognized as the self-sentiment and the superego. Some evidence that we are dealing with overlapping realms (mainly that the U.I. general personality factors include dynamic acquired structures, but not the specific drive strengths, which appear only in the purely dynamic-interest factorings) is also already available in the loadings of ergic factor scores on general personality factors (67, 192). The reality of the ergic drive identifications obtained by factors is further evidenced by the response of the tension levels of specific ergs so measured to specific real-life environmental situations which would be expected to influence drive tension levels. (See 44, Diagram 13–1, p. 553.)

Although the application of these dynamic measures to clinical problems is thus only on the threshold of realization and actual experimental data on relations to general personality factors is scant, it is clear that these possibilities of meaningfully measuring *specific* dynamic object attachments will bring a totally new level of exactitude, understanding, and control into the clinical unraveling of the individual dynamic problem, and at the same time integrate the latter with the use of the general personality measurements as so far developed here. Lately, the level of efficiency of traditional clinical procedures has come in for much critical examination by clinicians themselves and by knowledgeable methodologists such as Eysenck (87) and Meehl (156). For some onlookers, this failure of effectiveness is regarded as pragmatic proof of the falsity of the underlying theories. However, Hammer (110, p. 81), has noted that some of the therapeutic failure of analyses may be due, not to inadequate theory, but to inadequate skill in the enucleation of the pathogenic material. It is here that P-technique comes powerfully to the clinician's aid, offering positive evidence, say, that a patient's unusually strong interest in horses derives from a sexual or homosexual sublimation, or that a client's symptom of counting windows springs from superego activity. The quantitative indices of conflict should, indeed, permit a totally new level of precision of clinical treatment.

To use this method requires (see Chap. 14) the use first, of a reconnaissance test—an exploration of important symptoms and abnormalities by the usual methods. That is to say, there is no escape from the initial necessity of traditional, free associative location of the problem areas. Then, a true P-technique analysis can follow by inclusion of daily measures of manifestation strength of these symptoms and conflict problem manifestations along with standard P-technique marker variables for the major ergs and sentiments. Practical clinical skill is thus involved in coordinating the P-technique interpretation with the information about deviation of the individual (on R-technique norms) from the general population means on those general personality factors which are of dynamic modality, for example, Assertiveness (U.I. 16), Exuberance (U.I. 21), Anxiety (U.I. 24), Self-Sentiment (U.I. 36), etc. Even at the present stage of research we can be reasonably confident that these represent either (a) averages representing some total aspect of all specific ergs, for example, U.I. 21 may be total drive strength, or, (b) degrees of special transformations operating among and concerning all drives, for example, in U.I. 17, Inhibition, U.I. 24, conversion into Anxiety, or (c) average acceptance of particular values and acquired sentiment patterns, as in U.I. 20 total attitude on social responsibility, or (d) degree of development of particular dynamic structures, as in U.I. 26, Self-Sentiment development.

When the clinician, for instance, is unraveling Mr. Doe's attachment to a girl in Main Street, Kalamazoo, and her conflict-provoking remarks on the evening of June 25, 1960, his procedure could be enlightened by real, rather than guessed, values for these particular dynamic attachments, such as P-technique can provide. He would gain also from information in individual difference, R-technique terms, on the factor scores which permit him to relate these specific ergic expressions to the general dynamic levels of inhibition, anxiety, ego strength, etc. For the origins and consequences of specific attachments and conflicts are partly to be understood in terms of these more general personality measures. Moreover, his success in unraveling them is to be measured by (if not engineered by) the changes he can demonstrate in these general dimensions of ego strength, anxiety, general inhibition, etc. But these practical corollaries are a matter for Chapter 14.

Differences from Pre-Metric Theory Regarding The Roles of Anxiety and Environmental Stress, and the Introduction of a Total Personality Calculus Comprehending the Dynamic Analysis

In examining the ways in which the present findings lead to theoretical and practical developments beyond those reached by present clinical research methods, we should next, perhaps, bring out more explicitly the difference in weight and role given to Anxiety, when it becomes defined by the state (P.U.I. 9) and the trait (U.I. 24) factors and the second-orders in which these can be demonstrated to have further structural relations. Although many clinicians distinguish anxiety and neurosis nominally, there is good evidence that in practice, and in test and concept validation, they often actually fail to do so (see 5, p. 31). Our first divergence from the Freudian position that "anxiety is the central problem in neurosis" has been clearly to distinguish anxiety as a functionally unitary factor, with a host of identifying properties, from the totality of neuroticism and from the other components in that clinically segregated totality.

Further, we have recognized bound anxiety, not as a single separate factor, as the name now implies to most employing it, but as a variant probably bound up with the action of two or three quite different and specific inhibitory and controlling factors (for example, U.I. 17 Timidity, U.I. 20 Comention, etc., as described in Chap. 5, pp. 102 ff.). However, perhaps the most important theoretical difference from the classical views, which often regard neurosis simply as an anxiety expression and speak synonymously of degree of anxiety and degree of neurosis, is our emphasis on anxiety's intrinsic freedom from pathology and our insistence that the anxiety factor scores can be extremely high in normals for purely situational reasons. Anxiety, in the broad range of everyday adjustments of everyone, is demonstrably very little correlated with neuroticism, and over the normal personality ranges the final statistical association with neuroticism can be slight. High Anxiety can exist with complete absence of neurosis. And in a subsequently severe neurotic case, observation suggests that Anxiety's appearance and disappearance is different from, and usually precedes, by an appreciable period, the appearance of neurosis. Indeed, nothing in our data prevents the assumption that in some cases, Anxiety actually may be a sign of health.

Turning at this point to our position in relation to pre-metric views of the relatedness of neurosis and psychosis, it is evident that our findings compel us to move towards the camp of those who have contended that they are entirely different entities. This conclusion rests on (a) the difference between neurosis and psychosis in their patterns of relation between anxiety level and manifestations of inability to adjust, (b) the pre-existing evidence of higher constitutional and physiological determination of psychosis, (c) the marked difference from normals on personality factor-profiles, obtainable for neurotics but not for psychotics (see Chap. 6).

Our sampling of psychotics has not been at all as adequate as that for the neurotics, our main object of study, but it is sufficient to indicate that psychotics as a total group differ little from the personality norm. There are some few differences, however, as Table 6–1 shows; psychotics as compared with normals, have appreciably greater Ego Weakness, C—, and Trustfulness, L—. On second-order questionnaire factors and on the few objective test factors used thus far in research, the pattern for psychotics does not diverge significantly from the normal. (See Chap. 6 for details.)

One possible conclusion from the above might be that neuroticism is woven into the very texture of personality, whereas psychoticism is a loss of contact with reality that can overtake any type of personality.

Indeed, this seems quite obvious in the organic psychoses and in those psychotic-like disorders due to temporary poisoning. Presumably, research could now go ahead to locate a factor of "degree of contact with reality" (which is indeed what we expected our U.I. 25 to be, but in regard to which we have been unable to substantiate Eysenck's conclusion that his similar factor is the psychoticism factor). The determination of the one or more dimensions distinguishing psychotics is rendered difficult, even theoretically, by the lack of a formula for the proper proportions of the various syndromes that should constitute a psychotic "type" or clinical criterion group. At present, we are prepared to find that some of the above few differences we have found, as well as Eysenck's psychoticism factor difference, may really be connected with, and arise from the preponderance of, some one syndrome group in the research sample. Our data are at least not inconsistent with the proposition that the average psychotic is a person of undistinguished personality who has lost contact with reality.

Returning to our further theoretical differentiations and developments in the realm of systematic conceptualization, our main departures, additional to the different role of Anxiety in relation to neurosis mentioned above, lie in a sharp distinction between the state of Anxiety and (a) the Adrenergic, fear-anger response, and (b) the Stress or Effort Stress (as we have called it) response: This has importance both for inferences about the physiological consequences of Anxiety and for the cultural-taxonomic list of recognized stimuli properly to be called anxiety stimuli. The expression of U.I. 24, Anxiety, always seems to be associated with time-remote and only symbolically present threats. Physically present threats or challenges evoke fear-anger (Adrenergic) or Stress responses and may actually tend to inhibit Anxiety (see Chap. 11).

Present or immediately imminent stresses, insults, and trauma are found also to reduce certain neuroticism factors, for example, Regression, U.I. 23— and the guilt state which we take to be the state equivalent of Rigid Superego, U.I. 28+. Until this has been checked, and the reality of differential effect on distinct neuroticism-contributing factors has been clarified, we are not prepared to argue for a radical change from existing theory here. But it does seem that traumata are not necessarily stepping stones to neurosis and might even, if kept within moderate ranges of challenge, have therapeutic value (see p. 252). It is conceivable that even without actually removing the inner stimuli for Anxiety (U.I. 24), Rigid Superego (U.I. 28+), and Regression (U.I. 23—), by the usual therapeutic disentanglement of underlying dynamic conflicts and repressions, a person could be kept free indefinitely from neurosis by "drowning" these stimuli by presenting constant challenging "noise." The craving of some moderately maladjusted persons for excitement and their dread of being alone may be some recognition of this quasi-therapeutic value of continual, small challenges.

Finally, our multifactorial theory departs from pre-metric theory in making possible a new level of exactitude of analyses of the individual case and in introducing a possibility of calculus to predict adjustment and to indicate the necessary emphases in therapy. In the first place, through measuring the general personality factor-profile, one finds answers to the questions, "What are the constitutional or early-crystallized problem-solving deficiencies that have operated in the past and must be counted upon to operate in the future situations about which the patient needs to be counselled?" and "How much of the neuroticism contribution is from early life mal-developments (e.g., U.I. 28+, Rigid Superego; U.I. 22—, Pathemia; and U.I. 16—, Premsia), and how much from recent regressions and exhaustions (U.I. 23—, Regression; U.I. 29—, Exhaustion of Willed Responsiveness)?" In the process of therapeutic re-education, guidance is also obtained from these same measurements. For example, one may ask, "How much of therapy needs to be essentially a re-education of 'philosophy of life,' as embodied in U.I. 16—, Premsia, and U.I. 22—, Pathemia, and how much only a re-evaluation of a particular trauma?"

This dimensional approach is, nevertheless, as we have stressed, no denial of the importance of unraveling the specific dynamic conflicts, past and present, of the individual patient. But it reminds the therapist (a) of what part, and how much, of the conflict, as seen by the patient, is real, that is, a true cause of his troubles, and how much is a misperception based on his present condition, (b) of how much real maladjustment is unavoidably tied to deficiencies relative to environmental demands, and how much is rooted in unsuitable playing of his constitutional trump cards in relation to them, and (c) of the fact that prolonged re-evaluation of a personal history of conflict actually amounts to a brick-by-brick rebuilding of a philosophy of problem-solving, for example, of a restoration of the more self-dependent, resourceful, even un– or anti-social reactions, that shift an individual higher on the Harric Assertiveness (U.I. 16+) dimension or some other dimensional change measurable in therapy. For example, a change may be badly needed on the Corticalertia-Pathemia dimension, U.I. 22, toward a more explicit, active, cognitive, less emotional approach to problem-solving such as normal education has established in the non-neurotic, but which is relatively absent from the series of educational incidents in the neurotic's family. The drama of the individual life-history still remains, but the therapist now handles it in a measurable framework of known deficiencies, causal forces, and directions of required change.

This same measurement and calculus, seen next from the standpoint of general personality theory rather than from therapeutic theory, opens up radical possibilities of research advance. It contains a formal system for establishing mathematical functions expressing the association of particular personality endowments and developments and particular life stimulus-situations or learning paths, which have importance beyond clinical application, in learning theory and in the practical realm of educational and industrial psychology. These "path coefficients of personality association" can, in principle, and soon perhaps in detail, be summed up for particular successions of paths. Along with this, it is recognized that particular age-bound "ripeness" or "imprinting" tendencies exist in ergic susceptibility to learning and to regression. Consequently, research on the summation of the effects of repeated paths, in respect to a history of adjustment problems, will aim to determine weights to be experimentally determined from studies of ergs and their normal maturation.

Further research on the summation of choice and learning experiences, in regard to their cumulative effects over the life-course, involves also, according to our theory, a calculus of feedback effects. Premsia, for example, may lead to failure to gain satisfaction by realistic steps at the α crossroads, which contributes to ego weakness, which again contributes to failure in a similar problem at the β crossroads a year or so later. The accelerating age curve of Self-Regard, U.I. 26 (44, p. 617), over the nine- to fifteen-year-old range, suggests some such feedback effect operating powerfully, for probably both regressive and sublimating action must be assumed to account for narcistic investment of the ego (U.I. 26+).

Indications of Research Needed in a Strategic Advance From the Position Now Reached

The comparison of our own theoretical structuring of neuroticism-anxiety phenomena and therapeutic methods just made with the existing, classical, pre-metric position reveals areas of substantial theoretical agreement, along with additions of totally new structures. Even where there is essential agreement, however, there is a problem of perception for the classically trained clinician, in integrating these experimental and psychometric supports into his thinking. They import into theory, research, and practice the results of a totally new methodology that may at first appear strange to the point of bizarreness, to most clinicians.

Indeed, it may well seem that although advances are presented in precision of conceptualization, ability to measure concepts, and in calculation and control procedures, we have, at the same time, complicated the picture. This complication consists, in the first place, of relatively numerous first-order factors to be recognized and interpreted, as well as their interaction in second-order factors. It must be admitted that research today has produced a long rollcall of ability, temperament, and separate dynamic factor traits, as well as some twelve or thirteen dimensions of state change in place of "stress." They have admittedly made the individual seem something far more complicated to describe and analyze than by the older and simpler trinity of ego, id, and superego and the dramatic battles among them which all novelists understand. Our main excuse for all this is that man *is* complex! Our confession to fellow researchers is that research worthy of the name generally introduces as many puzzling innovations as answers to old questions. Our apology to the psychology student is tempered with the observation that psychologists should not object to having to learn the nature and properties of thirty or forty personality factors when students in chemistry take more than twice that number of basic elements in their stride! But two considerations, above all others, justify psychologists' efforts to master these new resources: first, the rate of recovery by means of present therapeutic methods is not so high that practice and theory can be considered to rest on adequate foundations and, second, those who repeat these investigations are likely to find, in any case, that nature is structured much as we have stated—whatever interpretation may be given to these new complexities.

Nevertheless, we would be the first to admit extreme dissatisfaction with the incompleteness and untidiness of the new structures and to call for an independent attack on the more vital ambiguities, by even two or three hundred more psychologists—more strength than our own very limited resources have been able to bring to bear on the problem. Our data are very uneven in depth; and our theoretical development, while fairly clear in some places, is necessarily ambiguous and highly speculative in others. In some areas, for example, that of the factoring of anxiety itself; the determination of the profile differences, on questionnaire factors, of neurotics and normals; the second-order structure in the questionnaires, and so on, we are satisfied that the data will bear all the weight of theory one may wish to build upon it. But in other areas, such as the physiological developments and the culture pattern data, we have had to reach across large distances with rapid, approximate experiments. (Where, incidentally, we might perhaps have reasonably expected vital data to have become already available after so many decades of clinical discussion and writing on these topics!)

These areas in which we have started what we believe to be adequate experimental designs (but as yet with inadequate statistical, empirical breadth of support), we have attempted to keep clearly separated from the more solid experimental ground, so that they will easily be recognized. In any appraisal of first steps needed in further research, attention must turn first to the consolidation of these issues of fact and to that increasing precision of decimal points in signifiance tests which the pure statistician constantly demands and which, at certain junctures, do become important. But one's attention is also directed to entirely new areas of research indicated by the more speculative aspects of this discussion. The necessity for data here becomes evident, sometimes painfully, to the investigator who evaluates the limits of the presently available data in the light of critical issues raised in the present, theoretical development.

Consequently, it seems to us a service to the active researcher in clinical psychology and to the student of theory, to set down here those avenues of research which we see fanning out from the newly acquired salient. To anyone sharing our sensitivity to present research deficiencies moreover, it will seem quite as important to indicate what the critical, strategic issues now appear to be as to contribute the meagre actual structuration we have presented above. Accordingly, we shall indicate, as briefly as is consistent with intelligibility, some eight areas, substantive and methodological, in which we believe research effort could now be most profitably expended.

Research Area 1: Checking mean factor differences of important syndrome groups. First come the needs for consolidation just mentioned previously. These include determinations on larger samples of the personality profile differences on (a) questionnaire factors, (b) objective test factors, and (c) second-orders among these, for neurotics and normals, for different neurotic syndrome groups, for different psychotic syndrome groups, and for delinquents. Samples now need to be such that significances of difference on each factor are very exactly determined and, additionally, such that the multiple r from the factors to criterion conditions, such as neurosis, becomes known within small limits. For it is theoretically important to know just what fraction of the criterion variance is being accounted for by ability differences, temperament differences, and dynamic trait differences.

Research Area 2: Checking the dimensions of state change as psychophysiological patterns. Just as in the trait area, also in the state area, but to a greater extent, there is need for work by that most valuable, but insufficiently honored researcher, the exact and adequate checker of earlier experiments. As usual, it is not mere repetition that is demanded, but increase of scale, avoidance of discovered methodological defects, and *retention of precise marker measures.* It is high time that psychologists began a thorough study of mood and dynamic state changes, by P- and incremental R-technique, to check on the twelve or thirteen main dimensions now hypothesized and to determine their physiological associations, their controlling conditions, and their second-order structure.

Research Area 3: Testing the hypotheses of factor interpretation, notably, on nature-nurture origins. Data for Research Area 1 could, in fact, be obtained by introducing measures on these factors in the routine testing of patients in a number of clinics and hospitals, psychologically well-equipped for such testing. As we turn now to research on fuller interpretation of the factors as such, we enter an area where special research design becomes unavoidable. The first strategic step here is to determine the nature-nurture ratios of the factors, for all profitable hypothesizing requires that we first know whether we must try hypotheses in the physiological, or the genetic field, or in terms of learning (or transformation) theory. The designs for such nature-nurture research have been discussed elsewhere (36).

Research Area 4: Understanding the life-course of factors. After illumination by these nature-nurture determinations, the interpretation, or even checking on present interpretations, of the factors can proceed by investigation of what may roughly be called their natural history. Some of this could still be done in routine situations—notably, testing population samples at various ages to determine the normal age trend, as we have begun to do (Table 11–3), and standardizing so that the eccentricity of any particular score can be appreciated immediately.

But the investigation of the nature of the individual factors has theoretical interest far beyond the natural history alone. Every factor represents an important psychological concept and a set of hypotheses. For example, U.I. 23—, Regression, is hypothesized here to mean something at least very similar to the psychoanalytic concept of instinctual regression; U.I. 28, to represent rigid development of the superego; U.I. 17, the general degree of inhibition; and U.I. 29 to be akin to diurnal fatigue, but of a relatively lasting nature. These hypotheses need investigating by methods other than factor analytic; by controlled experiment, for example.

It is one of the ironies of this decade of psychological research that clinical psychologists, perhaps perplexed by the technicalities of factor analysis, have, however, spent enormous research effort on armchair concepts instead of upon the new empirical, grounded concepts emerging from multivariate experiment. It seems to us that classical experimentalists, too, sometimes adopt concepts on rather flimsy indications, while they have standing before them all the time, fairly crying for theoretical explanation, a series of firm, well-replicated, broadly important factor patterns, of an exactness beyond anything else available. A concept should surely arise from indications in nature that it is needed. For the experimentally established, but often still quite unexplained, factor patterns, extending through most behavior which clinicians, personality, and learning theorists are interested in explaining, certainly need interpretive conceptions. For if the variance in the longest, most diverse list of variables lies in these factors, then the chief concepts to account for behavior must lie in them, too.

Psychology is a young science. Perhaps one difficulty with our methods of developing theory in psychology is that, as latecomers in the history of science, we do not realize that the survival rate of theories generated in certain ways has always been extremely low. Graduate students are often taught that the highest standards of scientific method have been reached if they explicitly state a hypothesis and test results by a statistical significance test. But the most important thing for real scientific advance is that the theory be well born, that is, that it have a higher-than-chance expectation of survival. If more hypotheses were based on these new, definite, replicable (but often mysterious and strange) factor patterns emerging from multivariate research, they would already have a guarantee of relevance which is so often lacking in armchair introspection and analogical processes.

Conceivably, many psychologists over the last decade have not availed themselves of these emerging evidences of patterns in behavior because they believe that one must become increasingly involved in the mathematics of factor analysis in order to do research on the psychological nature of factors. Admittedly, some psychometrists have become lost to psychology by preoccupation with statistical games and, sometimes, the statistical equivalent of non-Euclidean geometry. But a sense of perspective and purpose requires only that those who use factor analytic and scaling techniques understand their logic. Indeed, it suffices that the specialist in, say, physiological or clinical psychology, take over from experienced factor analysts the marker variables, perhaps as few as six good variables, which define the concept discovered factor analytically. Further investigation of its hypothesized nature could then go ahead without reference to factor analytic procedures and with no more complex statistics than those required to show by correlation, or t-test, or a non-parametric test, or analysis of variance that people higher on the factor (as measured by this six-test battery) are also higher on whatever variable the particular researcher has proposed to investigate. For example, a researcher could, in this manner, investigate our proposition that U.I. 23— persons are rated higher in signs of clinical instinctual regression; or that low U.I. 29 persons show more fatigue in decisions and other performances, as would be required in checking debility theory of this neuroticism factor.

With the recent publication of the O-A (Objective-Analytic) Personality Factor Battery (73) for measuring eighteen distinct dimensions of personality, the way is open for concentration, by individual psychologists, upon the particular interpretations and theories they can build around the concept provided by some one factor pattern. Actually, such factors as U.I. 1, Intelligence; U.I. 16—, Premsia (overprotection); U.I. 17+, Inhibition; U.I. 23—, Regression; U.I. 24, Anxiety; U.I. 32+, Introversion, fit right into, and supply a measurement basis for, ideas already long discussed in psychology but inadequately measured and defined so far. Others, such as U.I. 19, Promethean Will; U.I. 22+, Corticalertia; U.I. 25—, Imagination Tension; U.I. 34+, Autia, challenge us with somewhat new concepts and hypotheses, requiring ingenious construction of appropriately theory-inferred, new, experimental measurement situations for their crucial testing.

Of special clinical importance in this area of investigating hypotheses for particular factors are such steps as (a) checking the indications that certain factors have substantial variance only in neurotic or psychotic populations and are to be considered deficiency factors, skewed in distribution in one direction from a brief range of normal adequacy and adjustment; (b) testing the clinically important concepts of long-circuiting stress and goal-deflection strain against the patterns of F—, U.I. 35, etc.; (c) checking, among all known variables, especially those deemed relevant to neurosis, for the existence of any additional factor, beyond the twenty or so now known, that might distinguish neurotics and normals.

Research Area 5: Checking and extending the psychophysiological associations of neurosis and anxiety. For the physiological psychologist and physiologist, a whole realm of theoretical explanation remains to be given for certain patterns and connections. In particular, the physiological links between the serum protein, etc., aspects of the Anxiety and Effort Stress patterns and their clinical effects in prolonged life situations remain to be clarified, as well as the EEG connections with U.I. 22, and so on. The role of P.U.I. 1, Torpor *vs.* Excitement, in neurosis is particularly obscure. Research on the typical provokers of these states (as in Chap. 11), on their normal curves of duration and decline, and on sequences among them appearing with greater-than-chance frequency would be particularly valuable.

From the standpoint of pharmacology, the new possibility of measuring distinct psychological states (or the specific manner of their combination in some given state) should lead to interesting clarifications. For example, one suspects that iproniazid acts specifically on the P.U.I.

2 or Corticalertia dimension, reserpine on U.I. 24, and others on P.U.I. 1, Torpor *vs.* Excitement. Confirmation of such pharmacological effects on specific dimensions would lead to better understanding of the at present conflicting conclusions on the therapeutic value and permanence of the effect of these drugs.

Research Area 6: Theory of multiple interaction: personality change and path-record associations, with special reference to integrative learning studies. An avenue of study requiring bolder experiment, with new designs, is that having to do with all that we have discussed in this chapter concerning association of personality factors with life-situation response paths, under the title of Adjustment Theory. In this matrix device for handling multiple interactions, there are five parts now open to major systematic development: (a) rigorous checking of the *Adjustment Path Analysis (APA) Chart* itself against a great array of case histories, especially in terms of completing evidence on feedback paths and obtaining standard frequencies for the following of certain paths with a certain defined ecology (path-record frequencies); (b) *ecological research,* directed to shaping a cultural taxonomy, defining the principal, emotionally important situations and the genus or type to which each belongs; (c) within *Path-Choice Theory,* research is needed to establish the path-choice coefficients with respect to personality determining the choice of paths; (d) within *Transformation Theory,* research is needed to establish the path-transformation coefficients, with respect to effects of experience and learning; (e) examination is needed of the precise forms and assumptions of measurement scales, of coefficients, and statistical tests for what can be designated, *in toto,* as Adjustment Theory, and which implies, in calculation, *the matrix multiplication treatment of personality-adjustment relations.*

The natural inclination of experimenters when approaching this whole research field will be to use the controlled experimental approach. But even with the greatest ingenuity only a few of the choice alternatives and still fewer of the experience alternatives could be realistically presented in the laboratory. The typical choices, such as obeying–disobeying authority, going with, or withdrawing from, the peer group, aiming at achievement in athletics–school work, marrying–not marrying, taking one job–another job, joining–not joining a church, moving from one community to another, and so on, can be experimentally presented on paper to persons of different personality factor make-up and the specification equations determined. But, for equations in which one would have confidence, it would be preferable to have true life-choices, not paper and pencil "would-you?" situations. It would be still more unsatisfactory to hope to rest the alternative learning situation coefficients on anything but the natural, life-embedded experiences. For example, living with a rival sibling, experiencing the loss of a beloved parent, being disabled by physical illness, being brought up by a step-parent, experiencing constant failure or success in school, belonging or not belonging to a peer group, being happily or unhappily married over many years, advancing or regressing in occupational status, belonging to a privileged class or a minority group, and so on—all are beyond controlled experiment.

Once more, therefore, the enterprising psychologist will leave the nursery stage of methodology gained in the physical sciences and the simplicity of "brass instrument" univariate methods. He must move on to comprehensive, multivariate designs developed in the behavioral sciences, in which statistical ingenuity will extract relations that cannot be separated by controlling the environmental stimuli. The methodology in this particular field of personality-adjustment calculus becomes one of testing the accuracy of fit of a product matrix (C in Table 13–2) to an empirically obtained matrix of values. This can be used as a test either of hypotheses stated for path-personality coefficients (Matrix A) or for path-record coefficients (Matrix B). Since the latter can almost certainly be obtained by observation, the method is largely one for experimenting with simultaneous hypotheses about the path-personality coefficients of many personality dimensions until a set is obtained which gives the best total (least squares) fit.

In obtaining the empirical C matrix for thus testing hypotheses, the need undoubtedly arises for large scale developmental studies, in which a sufficient number of children are measured on most personality factors and retested after a lapse of, say, five years. These studies will require both careful records of the real life-choices made in the interim, and of the experiments which life has presented in terms of differential experience. Such experiments must be large scale in order that sufficient cases may fall in the various sub-groups. This is especially important for the less common (skewed distribution) alternatives (such as specific delinquencies, exposure to sexual assualt, death of both parents), if they are to have association indices of relatively dependable statistical significance. Such a study should also get actual measures of the graded environmental influences, i.e., the family attitudes and educational influences which we have posited to be responsible for the personality development measured, for example, in terms of Premsia (U.I. 16—), Cortical Alertness (U.I. 22+), etc.

Such an approach offers learning theorists a chance, at last, to deal with integrative learning, i.e., personality learning, in the sense, for example, of learning to control (growth of U.I. 17+, U.I. 36, etc.), rather than the learning merely of means-end paths on the way to an ergic goal (see Diagram 13–1). Finally, the analysis of the learning curves for personality factors, under various repeated stimulus situations and at various ages, would permit the principle of ergic ripeness (role of imprinting, as a graduated phenomenon) to be investigated. This would arise notably in respect to our theory that increments in Rigid Superego (U.I. 28), from exposure to the same parental affection-cultural dominance situation, are especially tied to a susceptible two– to five–year-old period, and in respect to similar theories implicit in the description of U.I. 16 and 22.

Research Area 7: Relation of personality change to therapy differences and steps in therapy. Therapy belongs logically as a special section within Research Area 6, the analysis of developmental change. However, the study of personality changes associated with psychotherapy has such special methodological characteristics and social importance that it deserves special research planning. Solid, checkable knowledge of the incidence of neurotic developments will be an outcome of the methods used in Area 6 above, and this will include information on the distinctive genesis of the separate neuroticism-contributory factors and of possible special sequences in their development. One might hope to verify that the rise of U.I. 22—, Pathemia, and U.I. 28, Rigidity of Superego, during infancy, creates a predisposition long before certain later factors appear, and that rise of Anxiety, U.I. 24, is a necessary but not sufficient cause for subsequent neurosis as seen in U.I. 23—, Regression, and U.I. 29—, Lack of Willed Responsiveness.

Since therapy attempts to reverse the personality characteristics thus engendered by the neurotic process, research on therapy again offers special opportunities for revealing the separate changes in factors and the separate effects of various methods. From the point of view of improving therapeutic efficiency, such research could well provide entirely new insights on the correct sequence of attack upon particular neurotic deviations. For example, the possibility of accurately measuring anxiety level suggests a variety of researches on the effects of comparatively sudden self-insight (i.e., breakdown of resistance) and of subsequent, dynamic relearning experiences upon plotted anxiety levels from session to session. This could lead to optimum use of the anxiety level in motivating re-adjustment.

The brief, pioneer incursions into this field (Chap. 11) suggest, for example, that present therapeutic processes do reduce Anxiety (U.I. 24) and also increase Extroversion. However, it is from the new possibility of keeping an Anxiety chart, as physicians began to keep temperature charts with the advent of the clinical thermometer, that hopes of a whole series of valuable new laws or generalizations in therapy can be expected. Of course, much research here could again be done by even slight increases in the routine testing of patients in clinics and hospitals, notably by keeping records of weekly scores on the brief special tests described in Chapter 15 for (a) Anxiety level, and (b) severity of neurotic condition.

Research Area 8: The mapping of cultural environment and the evaluation of stimuli. The development of a taxonomy of emotionally important situations in our culture has been indicated as an essential part of the main development of the matrix treatment of Adjustment Theory in Research Area 6 above. However, there are aspects of this which invite a special study in and of themselves. A systematic treatment of environmental values can be approached on the one hand, with the methods favored by the psychophysicist. On the other hand, and with greater comprehensiveness, they need to be studied in terms of the interests of the sociologist and the cultural anthropologist. In the former, we are interested, beyond the gross path-personality factor coefficients of Area 6, in the exact manner of response of the personality factor measure to a variety of challenges, repetitions of experience, etc. In the latter, we are interested in the global neurosis– and Anxiety-producing characters of cultures and sociological, ecological conditions. A beginning has been made elsewhere (44, pp. 852 ff.) with a methodology for trans-cultural comparisons of personality factors, and some results have already been obtained regarding differences of Anxiety and neuroticism levels across cultures (see Chap. 11). To satisfy the methodological desiderata, this area requires careful planning and also resources for sampling on an adequate scale. Transformation theory, of course, offers the bridge whereby the psychophysicist's precision and the anthropologist's comprehensiveness can be brought together.

Research Area 9: Dynamic trait measurements and the exploration of the conflict index. Among the most vital and promising of all research areas is that connected with the measurement of the dynamic trait factors, not available as valid measures at the initiation of our researches and introduced only in this late chapter. Especially, there is a need for pushing ahead with use of the conflict index, concerning which we have been able to include only the first study.

An instrument has just become available for dynamic trait measures, as a result of the several replicating researches on the ergic and sentiment factors discernible in dynamic trait factorings (50, 56, 61) in the form of the Motivation Analysis Test or M.A.T. (74). This group (or individual) test (and the corresponding School Motivational Analysis Test, now in preparation for children) has been constructed to measure the tension level on five ergs (sex, self-assertion, fear, etc.) and five sentiment structures (self-sentiment, superego, etc.). Moreover, it supplies each of these measures in two forms (a) in terms of conscious, integrated expressions, and (b) in terms of unintegrated and partly unconscious expressions. It now becomes possible, therefore, (a) to compare groups, such as neurotics and normals, on the tension levels of various ergs, and the strength of various ego and other sentiment structures, and (b) to retest the same individual on a developmental series of occasions, for example, successive therapeutic sessions.

The above presents the possibility of checking many hypotheses about the frustration, sublimation, etc., of drive energies and of examining the role of tensions in specific ergs. It also permits measures of the growth of superego and other sentiment structures, and further exploration of the conflict index, C. Almost innumerable possibilities spring out of the C index, but one may particularly mention (a) checking the change of C with therapy, (b) evaluating the prediction value of the various possible ways of scoring it, (c) checking its reliability when derived from alternative samples of drives, for example, as percentage-frustration versus total-frustration, and (d) examining the capacity of the index to agree not only, as present evidence shows, with psychiatric estimates of total conflict, but also with psychiatric understanding of what particular drives are involved in the conflict and what specific object attachments are involved, as well as what parts of the conflict are conscious and unconscious.

This last deals essentially with the possibility of converting psychoanalysis, in so far as its structural concepts are empirically verifiable, into a quantitative calculus. This would have importance not only for the precision of routine clinical operations in the individual case, but also for the consolidation and growth of psychodynamic laws at present unconfirmable because of the tenuousness and unreliability of unaided clinical perception of drive strengths, anxiety level, etc.

Summary

1. At the point of crystallization of theory here reached, it is necessary first specifically to clarify the developments beyond, and differences from, pre-metric classical theory and certain univariate experimental approaches, connected therewith. The present specific departures are that: (i) the differences of neurotics and normals cannot be explained in terms of a single factor-dimension, but rest on significant differences on at least ten first-order factors and several second-order factors, (ii) the imbalance in neurotics is not resolvable entirely in terms of malfunctioning within the trinity of ego, id and superego factors, as in classical clinical theory. Factors roughly corresponding to these, at abnormal levels, can be found, but they explain only a fraction of the neurotic variance, the remainder of which is concerned with (a) poor problem-solving capacities, (b) temperamental tendencies, (c) family atmospheres, and (d) energy deficiencies apparently independent of the conflict; (iii) by

virtue of these other components, a much higher role must be assigned to hereditary causes than most practicing clinicians have admitted; (iv) environmental influences having the nature of family atmospheres such as generation of the personality factors U.I. 16—, Premsia, and U.I. 22—, Pathemia, are introduced as being at least as important as individual infantile trauma, within the environmental sources; (v) the correlation of Anxiety with neurosis is far lower than classical views have held, and considerably modifies the view that "anxiety is the central problem in neurosis." Anxiety may be very high in normal individuals and, also, the maladjustment in neurosis is not always primarily evident in, or caused by, deviations of Anxiety; (vi) beyond differences of conceptual conclusion, there is a pervasive difference in methods of research and techniques of clinical practice. The conceptual differences arise from resting laws on measurement; the clinical differences emphasize the constant strategic and tactical need of conceptually clear tests in clinical research, diagnosis, and therapy.

2. Comprehensively, the conclusions from our evidence, regarding differences of neurotics and normals are: (a) that they lie on quite different dimensions from those of psychosis, (b) that they are initiated by differences in personality and situational factors affecting frequency of encountering and by-passing barriers, (c) that they are expressed later by personality factors affecting the readiness to internalize conflict and to handle internal conflict by repression, and (d) that the personality dimensions finally associated with neurosis include factors of an economic, energy level kind. These, along with non-neurotic, general personality factors, determine the final expression of the neurosis. The differences here stated can be demonstrated consistently in questionnaire and objective test measures, and in both first– and second-order factors.

3. It is proposed that these differences of neurotics and normals be understood as a special case within a general Analytical Adjustment Theory. Adjustment Theory handles adjustment as a relationship between a multi-dimensional personality and a multiple path adjustment process chart. The adjustment process is covered by path-choice theory, which relates personality dimensions to resulting choices in adjustment paths, and transformation theory, which relates path experiences to learning and other forms of personality transformation, such as sublimation, imprinting, and physiological change.

Adjustment theory expresses itself in an adjustment calculus which requires matrix formulation to pay proper regard to the multi-dimensional determination of any single change.

4. Path-Choice Theory and Transformation Theory in turn break down each into conveniently circumscribed areas of substantive and

methodological research. Path-Choice theory (and its matrices) breaks down into a general set of personality path-choice indices and a set of indices reflecting a taxonomy of specific environmental objects in terms of dynamic potency. Transformation theory (and its matrices) breaks down into consideration of path-transformation indices and path-frequency records. The former analyze again into general path-transformation indices and a set of indices reflecting, as in choices, the taxonomy of specific environmental experiences in terms of modifying potency. These general path transformation indices in turn are resultants of indices for specific kinds of learning (integration, conditioning) and other resource-economic kinds of transformation.

5. Analytical Adjustment Theory thus sets up matrix equations which can be used in several directions according to what data are given and what unknowns are sought, but, especially: (a) to estimate the personality profile of an individual or group (mean) known to have had certain path experiences; (b) to estimate path-choice coefficients, knowing path records and pre– and post-personality profiles, and (c) to estimate past path experiences or required future therapeutic path experience frequencies to produce a defined personality profile.

In research, agreement would be tested by comparing the degree of least squares fit of the predicted profile to the empirically measured profile for one theory and for another theory. The virtue of analytical adjustment theory is, like that of any multivariate method, that it permits experiment where manipulation of the important life-conditions cannot be attempted, and it retains perspective by keeping the variances from all experiences and upon all personality dimensions in view simultaneously.

6. Applying Analytical Adjustment Theory to the present problem of neurosis, we are in principle setting up path-choice indices and path-transformation indices, based on present knowledge of our hypotheses on personality factors, as discussed in Chapter 12. We are then multiplying these by hypothetical path-frequency record indices, corresponding to those which lead to neurosis in the Adjustment Process Analysis Chart, to obtain the expected personality deviations (factor standard scores) for the typical neurotic. Since, at present, these steps can only be taken roughly we have not aimed at a time quantitative statement but only at a rank order of expected personality factor deviation magnitudes and directions that should be associated with neurosis.

7. Pre-metric theoretical developments *outside* classical clinical systems in the form of the concepts of long-circuiting strain and ergic goal-deflection strain also are discussed, with their hypotheses about their relation to factors and to neurosis. It is hypothesized that each of the "strain" concepts is to be regarded as the outcome really of two

factor influences: (a) an influence reflecting the extent of external demand for modification, and (b) a limiting influence expressing the constitutional difficulty in modifying.

8. Research findings on purely dynamic factors, making possible the measurement of ergic tension levels and the strength of investment in particular sentiments, are too recent to permit an application to our study of neurosis which is as systematic as was possible in the case of general personality factors. In a few, but not all, instances, they appear to be alternative approaches, in a new medium, to factors already recognized in the general personality realm.

Although these common dynamic trait structures, such as ergic tension levels for sex, fear, aggression, strength of self-sentiment and superego, thus introduce those dynamic structures which the clinician may find to some extent lacking in our rosters of general personality dimensions, they do not entirely reconcile the present experimental concepts with previous concepts in clinical psychology. The divergence of concepts still exists for two reasons. (i) These purely dynamic factors, experimentally discovered, while corresponding reasonably in number and nature with concepts of, for example, Freud and McDougall, are still common traits. That is, their measurement gives a statement of tension level of each on a scale meaningful to all men, whereas the clinician is typically far more interested in their particular fixations in incidents and interests idiosyncratic to the patient's personal life-history. (ii) Our theory of neurosis does not permit complete resolution of the neurotic constellation into purely dynamic factors but insists that the general personality factors, temperamental, energy-economic, and abstract dynamic structural are as important for actuarial prediction as the dynamic conflict itself.

9. A reconciliation in (i) in paragraph above, but not in regard to (ii), becomes possible when dynamic trait measurement is made unique by P-technique, rather than common by R-technique. Measured values are then obtained for individual interest fixations and conflicts. Additionally, the therapist's handling of individual conflicts by free association, etc., can be seen as a procedure to change levels of scoring on common general personality factors.

The metric study of unique dynamic traits, in relation to their idiosyncratic, historical origins and present symptomatology, is possible through P-technique. The first results of such dynamic P-technique study with patients show that a C index, calculating the degree of conflict in terms of cancellation between positive and negative loadings of the principal drive expression for a given individual over a wide array of life-interests, is significantly correlated with psychiatric ratings of conflict, with patient *vs.* non-patient status, and with measures of ego weakness. It remains to be seen if this calculus of conflict in terms of opposing action of measured unitary drives and sentiments will also give objective evidence of areas of high conflict and will agree with clinical evidence as to the nature of the crucial drives involved.

10. The present theoretical summary is presented as theory derived from a wide domain of experimental evidence, some of which was not originally planned to answer our own theoretical questions and which remains, at many points, at very uneven levels in regard to dependability and replication. Accordingly, we have concluded by summarizing the crucial points at which research is now most needed, as follows: (a) checking main factor mean score differences of syndrome groups, (b) checking the patterns of the twelve or thirteen dimensions of state change, (c) testing hypotheses of factor interpretation by special experiments, (d) understanding the life-course (natural history) of factors, (e) checking and extending theories of physiological association of neurosis, etc., (f) developing the methodology and matrix calculus of Analytical Adjustment Theory, by attention paid to personality change and path-record index research and to precision of statistical formulation, (g) studying specifically the relation of personality change measures to therapy differences, (h) mapping cultural environment and evaluating stimuli, and (i) measuring dynamic traits and the conflict index, C, in relation to widening areas of clinical data.

CHAPTER 14

THE STRATEGIC USE OF MEASURING INSTRUMENTS IN CLINICAL DIAGNOSIS AND THERAPY

Need for Pragmatic Testing of Theory by Clinical Application

The touchstone of research soundness, for the perennially overworked practicing clinician, is that it enables him to do more in less time. For him, the payoff of true advance is that it augments his professional effectiveness. Even the pure theoretician could do worse than use this touchstone of pragmatism, for sometimes it is only by their fruitfulness in technological offspring that he is able to distinguish genuine, potent theories from the bogus profundity of purely verbal theoretical jargon. Unfortunately, pragmatic studies of clinical success have been few and difficult to appraise. Indeed, the failure of practitioners to stop and find out how well they are doing has fostered stagnation, both in theoretical development and in practical effectiveness.

Granted that the diagnostic and therapeutic success of various therapies and schools of theory should now become subject to public scrutiny, the task falls to the experimenter to provide measures. Eysenck, Fiedler (87, 92), and an all too small band of other eminent psychologists have begun to provide answers. Contrasting with the degree of social and journalistic acceptance of psychoanalysis and other established psychiatric systems, these answers indicate a disturbingly low efficiency of both diagnosis and treatment.

Eysenck's data (87, pp. 25–32) suggest that certain schools of therapy have lived on credit at the bank of public credulity to a truly amazing degree. But all this is changing. Technical advances on many fronts, including the possibilities of measuring changes in neuroticism and anxiety levels as discussed here by tests, and from social worker evidence, as well as the methods for evaluating diagnosis and therapy proposed in the pioneer studies of Meehl (156) and Kelly and Fiske (129, 130), are providing the tools of evaluation. The day is fast approaching when the real effectiveness or, alternatively, the unwitting charlatanism, of various clinical techniques will soon be limelighted.

Furthermore, when clinical researchers rally to the use of objective tests and factorially defined measurements, psychology should, in a reasonable period of time, attain to a new harvest of exact dynamic and general structural laws in the field of personality. Such a growth of theory should bring with it degrees of control and nicety of diagnosis scarcely conceived of in pre-metric theory and practice. However, it would be ridiculous to overlook the fact that at this moment, although the basic concepts and measures propounded here are founded on a rock of replicated, and, hopefully, still more widely replicable results, the new tests have been available for no more than a few years or else are entirely unused in practice. Consequently, the feedback from varied clinical research and practice is either limited or even nonexistent and makes perhaps a half of this chapter only "a statement of things to come."

However, it has been the majority opinion of clinicians who have read the first part of this book that they would like to see the authors proceed to a brief but systematic sketch of the actual routine usages that would be proposed, arising out of the measures and findings developed in this research. Two chapters are accordingly added here to meet this requirement, one dealing with the proposed clinical procedures and inferences and one describing the actual tests now available, in the form of a collection of condensed test handbooks, describing standardization, administration time required, age ranges for which they are suitable, etc. According to one's taste, one can proceed at this point either to look in detail at the actual test descriptions in Chapter 15, before returning to their use in this Chapter 14, or follow our chosen sequence which describes the clinical procedures here in Chapter 14, leaving Chapter 15 as a kind of appendix on instruments. In certain graduate courses it might be better to first become familiarized with the test instruments in Chapter 15. We have kept the present order for those who wish to see the inferred clinical research and practice here, following directly on the theory of Chapter 13.

To avoid misunderstanding, let us repeat that certain proposed clinical procedures are as yet only inferred. Others have actually been in use, although only in a few pioneer institutions, over the two to five years since various stages of our researches have been completed. In physical medicine the step between discovery of the properties of, say, penicillin and the proof of its clinical usefulness and limitations took at least a decade, and one can realistically expect no less time for feedback from basic research on functional measurement. The important thing is to provide a framework of proposed systematic clinical applications, as we have set out to do in this chapter. For the verdict can come only from bringing about clinical research and extensive experience by clinicians.

Diagnosis: Understanding the Roles of Common and Unique Trait and State Concepts

Let us begin with the problems of diagnosis. Further, let us reiterate one of our basic measurement principles, that whether undertaken by clinical impression or by tests, diagnosis is sometimes dealing with common traits (such as general intelligence or the sex-drive strength), which have approximately the same pattern for all people, and sometimes with unique traits. The latter include the rare symptom, an idiosyncratic expression of interest, or traits for which there is no normal distribution or common dimension in the general population in terms of which the individual could be scored. A fuller account of the logical and statistical inter-relations of these two conceptual treatments has been given elsewhere (44, Chap. 15).

However, let us be clear that not all the uniqueness of an individual requires unique traits to account for it. Much individuality is reducible to a unique combination of common-trait measurements. For example, by stating a particular combination of scores on the common traits of Intelligence, Extraversion and Anxiety, a good deal of the uniqueness of an individual's behavior is described in terms of common structures and continua. On the other hand, particularly in the dynamic field of interests, attitudes, and symptoms, expression in common traits is relatively coarse. For an exact and complete delineation of structure we may then have to turn to factor measures in P-technique, which gives the loadings of particular dynamic expressions, i.e., of a particular drive, as they occur in that individual, rather than as an average for the general population. This rather complex concept has been discussed here in connection with the use of P-technique for recognizing the patterns of states in individuals (see Chaps. 9, 13), and it will need further development later on. But at least we should note here that those dynamic causative connections in the life-history of the particular individual, which have been the heart and substance of so much clinical writing and discussion, are objectively to be discovered by P-technique, and cannot be caught readily in gross common-trait measurement.

This last fact—and indeed, the whole problem of conceptually reconciling common and unique trait systems—has given many psychologists an intellectual migraine, resulting in a diagnostic diplopia, and in extreme statements about the importance or unimportance of one or the other system. For example, when Freudian writings or personal clinical experience pointed to the outstanding importance of the conflicts and fixations peculiar to the individual's personal history, the clinicians of a generation ago threw overboard all concern with common traits. A double standard arose in which the IQ, a common trait measure, might be taken in Child Guidance Clinics, but not for the middle-aged, upper middle class neurotic patient. (This difference of emphasis, of course, was partly for reasons which had nothing to do with theory. The psychoanalyst's patients were already usually at a selected level of education and intelligence—and income!) Perhaps the more important practical consideration has been that the clinician knew of no tests for those admittedly common traits in which he had always been interested, such as tension level of the sex drive, level of general anxiety, severity of neurosis, etc. Now that these can be evaluated, the therapist may avail himself of the same increase in exactness of diagnosis as did the medical practitioner, when laboratory technicians provided innumerable blood tests for evidence to be added to his previously purely clinical diagnoses.

The clinician will still have a special interest in unique traits, to an extent unrealizable, for example, by the educational psychometrist, and in recognizing both unique and common traits he must clarify, theoretically and statistically, the role of common trait measurements in his practice. First, he may have to retreat from the almost complete rejection of common trait evidence as such, which some psychoanalysts have affected. What general medicine has long recognized, in Sir William Osler's paraphrase of a seventeenth-century physician, needs recognition by the psychologist and psychiatrist, namely, "It is quite as important to know what sort of man has the disease as to know what sort of disease the man has." In other words, by appropriate test batteries, the clinician should initially find out the level of his patient not only on intelligence but also on such other common traits as Ego Strength, Anxiety, Surgency, Schizothymia, etc. For until he knows of what stuff the patient is made, and in what condition he stands at that time on the major human common traits, his view of the dynamic conflict as such is without perspective. Without knowing the patient as a whole he can neither best decide the personality resources and occasions through which to proceed in therapy nor the best possible goals of adjustment, in occupation, social activity, etc., toward which he and the patient should profitably work.

For example, a naturally Surgent (F+) person may hope to seek activities and sublimations in social life which would be impossible to a Desurgent type; a school child of good IQ may work toward compensations and confidence in school achievement which it would be unwise to count upon in a case of low IQ; and a patient of high Ego Strength (C+) may tolerate removal of resistances and the contemplation of repressed material, that might bring another to the verge of suicide. The fact that the capable clinician must take as good note of the general and constitutional personality dimensions of his patient as a skillful carpenter does the grain of his wood is, indeed, recognized in practice by the majority of clinicians, even though often neglected theoretically or when describing the dynamic diagnosis. Throughout this book, in many different contexts, we have therefore emphasized the necessity of actually measuring the entire personality for complete understanding and effective treatment of any specific disorder.

Syndrome, Source-Trait, and State Diagnosis by Trait-Centered Testing

Disillusionment and dismay over classical diagnostic categories culminated a decade ago in, among other things, the wistful belief that one could somehow proceed directly to understanding the patient's dynamic problem without attention to general diagnosis or noting any description of the overt personality. This belief arose partly from the misapprehension that classical diagnosis merely meant assigning the patient to a particular psychiatric syndrome category. Obviously, this meant very little, though one could argue that it is still worth doing, and that such tests as the Minnesota Multiphasic Personality Inventory (112) do provide a meaningful score in terms of these syndromes or "correlation clusters" (29). However, the alternative diagnosis in terms of underlying factors or source traits (29), though it admittedly still applies to common traits and the general personality, should do more than analyze surface traits (correlation clusters, syndromes [29]). It should tell us how the particular syndromes are built up in the given individual. For example, Introversion may be largely Desurgency or predominantly Schizothymia, the former indicating a certain kind of environmental origin, the latter a constitutional role and a different outcome. Similarly, of two anxiety neuroses, equally severe, one may spring more from a relatively high temperamental Guilt Proneness (O+) and another more from high Ergic Tension (Q_4+) associated with particular frustrations.

Chapter 7 has shown that the usual, all-or-nothing, syndrome cluster diagnosis can be alternatively expressed in terms of measured degrees of particular primary personality factors. The discouragement of clinicians in regard to syndrome diagnosis arose partly, and in the first place, from the increasingly well-documented discovery (6, 21, 152, 158, 197) that they were unreliable categories, in the hands of the usual practitioners. Various psychiatrists and mental hospitals record quite different percentages of patients in the diagnostic categories, and the reliability coefficients, worked out for psychiatrists' placement of an identical set of patients, are quite poor (see above references). This is no indictment of diagnostic skill but is inherent in the definition and natural history of correlation clusters which, as Cattell has shown statistically (29), merge indefinably one into another. By contrast, the designation of the patient in terms of his score on a combination of factors is an exact statement of where he stands, avoiding the unreality of forcing him into an all-or-nothing category. However, it also permits translation, if one wishes, into a statement of the nearest syndrome category, defined by a particular factor-score combination, as the centroid or central pattern in a cluster of patients. Alternatively, one can even describe a case in terms of scores on each of a combination of syndromes (see Chap. 7, pp. 134 f.).

Yet another source of misunderstanding in regard to clinical diagnosis lies in the tendency to carry over from medicine a concept of disease which does not apply to the findings in maladjustment and neurosis. This is the notion of a disease entity, such as scarlet fever or diabetes, which the patient either has or does not have. But, in our view, most of the non-psychotic disorders encountered in clinical psychology and psychiatry are abnormalities in the sense of excessiveness in something which everyone has, rather than diseases in an all-or-none sense. For example, one may speak of pathological anxiety, but our results show that the general pattern of expression of U.I. 24 Anxiety is the same at its mild levels in so-called normal people. Its pathology lies only in its excessiveness, in relation to norms and in relation to the adjustment and life purposes of the individual. Similarly, a neurotic is only a person with an excess of the external and internal difficulties and inadequacies from which everyone suffers in some degree. A related point confirmed by the number of distinct personality dimensions we have found involved in neurosis is that, in neurosis, it is imperative that the clinician eventually measure the total personality in terms of present level of endowment on all of the major common traits. If the neurotic is a person defined as having reached an extreme on dimensions common to all personalities or a pattern formed by a particular combination of such source traits, then the measurement of these dimensions is not merely a personality background to the diagnosis; it *is* the diagnosis—though underlying dynamic sources of the diagnosed condition remain to be found.

Although our emphasis is thus on measuring the patient, the style of measurement proposed is as remote from much current, traditional, psychometric practice on the one hand as it is from classical, psychiatric, syndrome diagnosis on the other. Hitherto, many clinicians interested in test instruments have spent an enormous amount of effort attempting to extract evidence on all aspects of personality from one narrow form of test behavior (perception of inkblots, handwriting, etc.). In our view, these approaches are foredoomed to reach only low levels of validity, for the variety of behavior tested is simply inadequate to act as a reference to the entire personality sphere. A single test is surely quite unlikely to be a good measure of more than two or three of the twenty or more known dimensions of personality; indeed, no single test is yet known that is a good measure even of a single factor, except that of intelligence.

By contrast to this "single gadget" approach—a revival of the pursuit of Ehrlich's "magic bullet"—the lines of research and application advocated here have put the personality structure first and the tests second and have admitted that each functionally unitary structure is broad enough to need a small battery of tests in itself. Complex techniques and programmatic factor researches have been the way—and so far the only way—to discover conceptions of what unitary traits and states exist. They have provided patterns of structure which can be further checked by replicated experiment. With the trait then defined, hundreds of tests have been invented and sifted until batteries have been obtained of significant, though not high and certainly not perfect, construct validity. Thus, an era has dawned at last for the investigative, and hopefully for the practicing, clinician, wherein what we may call trait-centered testing has superseded test-centered practice.

In this personality-centered development of measurement, the factor or source trait has become the focus of the psychometrist's interest, and the particular type of test gadget or homogeneous item scale used to measure it becomes a matter of some irrelevance. The division between psychometrist and psychiatrist or, more widely conceived, between clinical practitioner and general psychological theorist happily vanishes because the psychometrist's measurements now integrate more directly with clinical concepts and psychological theory. At this point the practice of psychotherapy can become a more exact, more harmonious, and more insightful art, in which an understanding of measurement theory is not a comparatively irrelevant flourish. Knowledge of personality psychometrics then constitutes as integral and indispensable a proficiency for the clinician as the knowledge of stress to a civil engineer or blood pressure to an anaesthesiologist.

Functional rather than merely itemetric (44, p. 162) homogeneous-scale measurement implies also the principle of indifference of test indicator. The personality dimension exists regardless of the form or existence of some particular scale. Except for certain slight, recognized, and measurable differences of validity, liability to motivational distortion, etc., the same factor source trait can be measured by any one of several different tests, according to convenience and aptness to the situation. For example, the Anxiety trait, U.I. 24, can be measured by the IPAT questionnaire (43) or by the Objective-Analytic test battery (73) (see Chap. 15), by group or individual tests, etc., with the confidence that one is referring to the same functional unity in personality.

Thus, there are testing situations, such as malingering in the military, where a questionnaire may be subject to severe distortion. This can be revealed, but not avoided, by inclusion of a motivational distortion scale in a questionnaire; but, where testing skill is available, this would be an occasion to use objective tests. The principle of indifference of test indicator means that one is not confined to a single patent test; it does not mean that one is indifferent to the desirability of choosing the test according to the situation in which the source trait is to be measured.

Available and Necessary Types of Tests

As stated at the chapter opening, a description of the particular tests available for clinical measurement of source traits, with specifications of times required, scoring, etc., is presented in Chapter 15. Accordingly the aim of this section is simply to consider the general nature and types of available test alternatives, not the specific tests. This swift glance at tests enables us to discuss in the remaining part of this chapter the clinical use of such measures with due regard to the exigencies of clinical routine, time, and resources. The chief types of instrument needed for clinical examination may be divided into General Purpose and Special Purpose tests, as described elsewhere (Chap. 15). They may also be divided, of course, into devices for measuring common traits and devices for measuring idiosyncratic unique traits. Let us briefly consider what is available under these categories.

COMMON, GENERAL PERSONALITY TRAITS. *General purpose tests.* A general purpose test aims to give the maximum information about the total personality or the full range of primary abilities per se, without regard to prediction of some one specific criterion, but with a relevance to all possible criteria. In the clinical situation there is need for a measure to cover simultaneously the principal, independent, general personality dimensions, including a measure of intelligence. For greatest utility the instrument needs to have two or more forms, to allow retesting; that is, to determine directions of shift of personality measures under therapy. There are several such batteries, and the ones stemming most directly from the work of our laboratory are listed here [1] and some are treated in specific detail in Chapter 15.

1. *Multiple-factor personality questionnaires,* of an hour or less in duration. The only series of factored personality questionnaires available to cover the same replicated personality factors developmentally

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[1] In this chapter, we shall concentrate on those factored tests which have figured most directly in the actual empirical research on which this book's findings are based. Then in Chap. 15 we shall expand to trace some of the relationships between these tests and other well-known psychological instruments, such as the M.M.P.I. (112), the Taylor Scale (212), etc.

are the 16 Personality Factor Questionnaire (or 16 P.F.) Forms A, B, and C for adults (62); the High School Personality Questionnaire (H.S.P.Q.), for 12 through 16 years (51); the Child Personality Questionnaire (C.P.Q.) for 8 through 12 years (176); the Early School Personality Questionnaire (E.S.P.Q.), for ages 6 through 8, and the Pre-School Personality Questionnaire (Oral: the P.S.P.Q.), for age 4 to age 6. These maintain at least some degree of continuity of measurement on the same factors through the age ranges indicated. The first three are published (51, 62, 176), while the latter two are in preparation. The main research references to construction are in the above handbooks and elsewhere (29, 41, 44, 58, 75). The 16 P.F. and the related younger-age questionnaires (H.S.P.Q., C.P.Q., E.S.P.Q., P.S.P.Q.) are for administration when one has the cooperation a questionnaire requires and are therefore usable in most clinical and some industrial situations. The 16 P.F. and the H.S.P.Q. are available in foreign languages and therefore permit comparisons with studies abroad.

2. *Multiple-factor objective test batteries,* notably the Objective-Analytic or O-A Battery (73), available in children's (age 11–16) as well as adult versions, covering eighteen personality factor-dimensions. The O-A batteries, being objective, are relatively unfakeable but for their administration require longer testing time and more psychological skill than do questionnaires. The O-A permits of being chopped up into single-factor batteries requiring only about 20–40 minutes each. The clinician would be particularly interested in U.I. 23—, Neurotic Regression; U.I. 24, Anxiety, etc.

3. *Dynamic traits.* A measure to cover simultaneously the principal dynamic personality traits, notably the ergic tension levels and the levels of sentiment development. From this, one may determine, at a given moment, the strength of undischarged sex need, need for dependence, aggression, etc., the strength of the self-sentiment, the sentiments attaching the individual to home, religion, occupation, etc. The Motivational Analysis Test (or M.A.T.) (74) is the newest development in this direction. This uses the objective devices found valid for interest measurement (50, 56, 61) to measure ten demonstrated independent factors—five ergs (roughly, drives) and five sentiments (see 44, pp. 726 ff., as "D.D.T."; and 74).

Special purpose tests. The types of batteries cited above are called general purpose test batteries because they supply measures of the total personality which could be used for almost any purpose, clinical, education, industrial, research, and for predicting almost any criterion (when appropriate weights are placed in the specification equation). By contrast, we now encounter special purpose tests, again for common, general personality traits. A special purpose test may measure in given circumstances either some single dimension in which the applied psychologist is constantly interested (a special factor test) or some peculiar, special, rigid combination of dimensions in a single score which has been designed from the beginning for one particular criterion and which is not necessarily useful for any other.

Whenever time and circumstance permit, the clinician will want to use the comprehensive, general-purpose batteries, since his aim is to get maximum understanding of the total personality in relation to the clinical disorders. Nevertheless, there are situations where extreme brevity of test time is all important and where it is appropriate to measure a single aspect of personality only. Situations in which one can afford to lose comprehensive understanding for the sake of brief predictive use are not as common as many suppose, but they do exist. For example, in a survey of community mental health service needs there is no pressing requirement to measure the separate factors in neuroticism. A single brief neuroticism level test (see pp. 456 ff.) having the proper combination of factors to give a single criterion score, is appropriate. Or again, in the course of therapy, a measure on the full 16 P.F. may be desirable only at the beginning and the end of therapy, but brief measures of the single Anxiety factor level could advantageously be made repeatedly at particular turning points during the course of therapy.

Since there is a constant tendency to resort in practice to ever-briefer, special purpose tests (much as some physicians resort to an overall prescription of aspirin), it is desirable that we reiterate here their very real limitations. There remains a rigidity and interpretive limitation in any special purpose test, especially when it represents the highly particular, weighted combination of factors designed for one special criterion, rather than a single, pure factor test. Such composite special purpose tests, tailored to one criterion only, are, in any case, usually too brief to yield reliable part scores on such component factors. However, when it corresponds to a single factor, as in a scale for measuring Anxiety, F(Q)II, the result may still be usefully combined later, for different prediction purposes, in new batteries along with other factors.

Special purpose tests following the present research exist in the questionnaire medium for F(Q)II, Anxiety (43), and for the neuroticism-contributing set of questionnaire factors (194). Each of these needs only about eight to ten minutes for administration. As for special purpose objective test batteries, one intensified measurement of Anxiety is now available in the O-A series (68), and there are special batteries for each of the single objective-test, factor-dimensions U.I. 16 through U.I. 33 (73). These objective, special purpose batteries require about twenty to forty minutes each for administration.

Unique, idiosyncratic traits. *General purpose tests.* As yet there is no need to distinguish further here between general personality and dynamic modalities, for no system of tests has yet been developed to measure unique traits in the general personality, and, in any case, the clinician rightly has been interested primarily in the uniqueness of the individual's dynamic problem. The investigation of specific attachments of dynamic traits has hitherto been made through free association, misperception tests, hypnosis, and kindred clinical techniques of qualitative nature. As brought out elsewhere in this book (p. 415), experiments with the P-technique method (35) show that the unique individual attachments of ergs and sentiments in particular attitudes, symptoms, and physiological reactions can now be unraveled in fairly exact quantitative terms. This is admittedly at present a somewhat arduous procedure, in which one needs to keep quantitative records on the patient for at least fifty or more therapeutic sessions. These, combined with objective attitude measurements, must then be correlated as a set of time series, factor analyzed, and rotated to give the unique dynamic structure. However, it must be recognized that, at present, probably less than 10 per cent of clinical clients remain in therapy for fifty sessions or more; hence, this suggestion must be considered as primarily for this 10 per cent, and/or clinical research. The earlier test batteries (see 44, pp. 857 ff.) have been brought to tolerable standardization by J. R. Williams (223) and Arthur Sweney, Research Associate in Psychology, University of Illinois. Williams proposes fourteen marker attitudes and Sweney twenty, in both cases each attitude to be measured by three to five objective devices. These factor markers represent five or six major ergs, the self-sentiment, and certain other sentiments. (These are the same factors as in the Motivational Analysis Test (M.A.T.) individual difference battery, but the presently discussed battery is, of course, a P-technique battery, for a single individual.)

Such a battery, adapted to repeated administration, we shall call a Conflict Analysis Battery. Each time it is used it has to have added to it *ad hoc* scales for the particular symptoms shown in the initial consulting room exploration as important to the patient's difficulties. These can either be time-sampling or severity of symptom measures or measures of interest in the same valid motivation devices as the other items. By the aid of electronic computers, properly programmed, it has recently become practicable, at a cost of about $100 per individual, to factor analyze the clinical data of the individual patient, gathered in this P-technique design, and obtain objective, quantitative evidence both on the field of conflict and on the total Conflict Index. (See pp. 416–19.)

Special purpose tests. Any test measuring a unique trait in an individual, but doing so with no knowledge of its factor composition and using it simply as a criterion estimate, would fall in this Unique Trait—Special Purpose Test category. Obviously, by definition, such tests cannot be provided routinely. They are concerned, in clinical work, largely with means of measuring a waxing and waning psychological symptom, or a form of delinquency, or even a somatic effect. However, the principles for measuring such specific manifestations need to be clear and the clinician could well have on hand a number of model "items," or modes of recording time-sampling, etc., in order to build up such tests quickly. For example, in one of our P-technique studies, the patient's stuttering was measured from day to day by asking him twenty questions, always from the same twenty diverse interest areas, and recording the number of stuttering manifestations in the answers. The usual rules of scaling and test construction are all that need be applied in this type of measure.

Common dynamic and general states. Batteries can be assembled for common dimensions of dynamic state change, for example, ergic tension levels, anxiety, regression, depression, just as for common dynamic *traits*. Indeed, in general these common state batteries should be used also in P-technique studies of unique state variations in one individual, for without these as markers there would be no means of identifying the factor in the individual, the rest as idiosyncratic.

At the present stage of research, exact evidence is lacking to decide whether in some states we are actually dealing with nothing but fluctuation on a trait, or whether the state and trait patterns are truly systematically different. The latter seems to be the case with Anxiety, where it seems quite definite that the state has heavier loadings than the trait pattern on physiological variables (such as systolic blood pressure and probably 17-OH ketosteroids), as well as lower loadings on certain questionnaire factors (for example, the constitutional H factor). As far as the data go, tension levels on specific ergs appear to be well measured by the trait batteries, so that the M.A.T. can be used to measure state level at a given moment.

However, any use of a trait battery for state level measurement is qualified by two limitations: one, it is commonly not designed in a way that will permit its repeated use on the same individual without transformation effects, and two, it needs to be standardized ipsatively (44, pp. 492 ff.), that is, on the individual as compared to himself at other times, for each individual whose states are to be scored. Special dynamic state batteries are being constructed, for repetition, by Cattell and Sweney on ergic tension levels, the self-sentiment, etc. On the general personality factors, only the objective-analytic (O-A) trait batteries are in published form (73), but questionnaire and objective test state batteries for clinical research, some very near readiness for routine practice, have recently been assembled and are described in Chapter 15. Of special interest here is an eight-parallel-form Anxiety state battery 192a. An example of the type of clinical results which can be obtained through state measurement will be found elsewhere (44, Diagram 13–1, p. 553), showing dynamic factor changes in a young man measured over an 80-day period, as these factors fluctuated in response to rehearsals for a play, a serious accident to his father, etc.

Proposed Design for Conduct of the Diagnostic Examination

Initial categorizing examination. As stated in introducing the theme of the present chapter, our proposed conduct of the clinical diagnostic situation in the light of factored, functional measures is tentative. If the critical reader would be happier to consider this section as "Diagnostic Practice, 1970" we cannot object. Only about half of the propositions deal with measures we have actually tried in clinical situations, and the remainder, which we have tried to distinguish therefrom, rest only on the same kind of inferences from research as led to the introduction of the first half. However, the open-minded clinician might ask, "What would you advise we actually do with these new types of test?" and we want to answer. In seeking to answer this progressive question, we hope also to benefit basic research for, as stated above, widening knowledge of the functional measures will arise only from the challenge of use in research connected with clinical practice. And perhaps, with the help of clinicians free to do a certain amount of experiment, the knowledge of 1970 can be available in, perhaps, 1965!

As every experienced clinician realizes, he is by no means free to assume that every adult so distressed as to seek help regarding his psychological and psychosomatic symptoms, or every child brought as a behavior problem is diagnosable as a neurotic. The possibility of an incipient psychosis must first be ruled out. Indeed, the careful psychotherapist asks his initial questions even more widely and systematically, for he first obtains the evidence of a medical examination to rule out the possibility of physiological, especially neurological, origins of the symptoms. If the general medical examination is unremarkable, the main question within the psychological field is whether one is dealing with a neurotic, or perhaps an acting-out behavior problem, or some form of incipient psychosis. In regard to actual tests for psychosis, the present approach still lacks sufficient research on test instruments, because that has not been our main concern.

A relevant factor scale does exist, indicated in our own survey as U.I. (Q) 21 (44, p. 219) derived from factoring Minnesota Multiphasic Personality Inventory (M.M.P.I.) scales, and this has been recognized also by French (97) as a single dimension. But we would want to see replicating studies before fully adopting this conclusion, and we feel that the whole psychotic-normal difference needs an extensive study in terms of factors in unrealism *vs.* good reality contact. In any case, what would be immediately derived from the M.M.P.I. as a dimension of loss of reality contact has far too many actual symptom questions to be reasonably unfakeable and, by reason of the same concentration on symptoms, would not serve to measure degrees of loss of reality contact in incipient psychoses occurring in the still approximately normal range.

Such a questionnaire may be developed, but meanwhile, in the *Q* data realm, we have only the evidence on the 16 P.F. profile for 480 varied psychotics in Table 6–1. (In the objective test realm we have only the evidence from the R7 study. See Chap. 6 and Appendix I.) In the 16 P.F. profile, low factor L and, possibly, low factor A and Q_2 and a few others (see Chap. 6) distinguish psychotics from normals and neurotics, though a discriminant function weighting is desirable to give the best three-cornered distinction.

Thus, we would propose that the first or second visit to the clinic should be considered a typological diagnosis and perhaps designated the "initial categorizing examination." With the medical examination out of the way, this suggests a contact session in which the patient discusses his problem in introductory, qualitative terms, followed by three or four eight-minute, special purpose questionnaires for neuroticism, for psychoticism (44, p. 219), and for Anxiety. Needless to add, perhaps, the discussion in qualitative terms in the first and (part of) the second meeting has the essential function of giving the patient the attention he needs, before the relatively impersonal testing situation can be introduced.

From this half-hour of testing combined with the qualitative discussion, the initial categorizing examination will have given the psychotherapist not only a first answer to the question of what type of case is presented, but also a first rough, yet useful, quantitative answer to the questions, "How severe is the neurosis?" and, "At what level of Anxiety is the patient at present operating?" The testing will also give some preliminary information on the type of the neurosis, the age of the conflict, the strength of motivation toward therapy, and the role of situational threats in the present neurosis.

MAIN DIAGNOSTIC EXAMINATION: SUGGESTED BATTERIES AND ALTERNATIVES. Since it has been the most strongly defended thesis of this book that clinical or counseling work should pivot on an understanding of the total personality, the sooner the special purpose tests of the categorizing examination are followed up by general purpose tests the better. Except for such time as is necessary to continue the establishment of emotional rapport, the second and third interviews may therefore best be given up to systematic test diagnosis. This general purpose testing must cover both general personality traits and dynamic traits, but whether it shall be by means of questionnaire or objective tests must depend on the organization of the clinic and the available time per client. One must sadly but realistically admit that a third alternative, that of doing nothing more than the initial categorizing diagnosis, must be selected by a fair proportion of overworked clinics. Diagnosis as psychotic or neurotic, or as severely or mildly neurotic, or as a state of severe or mild anxiety, may be as much as the brevity of the subsequent therapy justifies! But relatively infrequently, when therapy runs from twenty up to two hundred visits (perhaps 15 to 20 per cent of all cases), it is surely reasonable to devote four to seven hours to diagnosis, as is done in many clinics, which means at least two or three hours available for the more comprehensive appraisal we are now describing.

The general purpose tests we are now proposing, for this more analytical examination are:

1. A questionnaire covering the most important of the roughly twenty personality dimensions discoverable in this medium. Here, the 16 Personality Factor Questionnaire (16 P.F.) has the advantage of restricting to well-replicated factors and those about which much criterion and genetic information has been collected. Moreover, its factors can be matched, in cases studied developmentally, with factors in the High School Personality Questionnaire (H.S.P.Q.) applicable to ages 12–16, the Child Personality Questionnaire (C.P.Q.) applicable to ages 8–12, and through tests in the research stage, for even younger children brought to clinics.
2. The Objective-Analytic or O-A Battery (73), in forms applicable to adults and to children of eleven to sixteen years of age, but requiring use of normal control groups, since standardization is not yet generally available. This battery will provide results comparable with those shown in Diagram 15–1 and for questionnaires in Diagram 14–1, distinguishing neurotics from normals virtually without overlap.
3. The Motivational Analysis Test (M.A.T.), at present only in adult form (74). This is aimed at measuring the tension level on the principal ergic drives, but also at estimating the dynamic development of sentiment systems and especially of the ego and superego structures.

The uses and intepretations of each of these three will now be discussed in the same order.

Diagnostic use and interpretation of the patient's scores on personality questionnaire factors. The standardization of the 16 Personality Factor (16 P.F.) test in A, B, and C forms permits the initial diagnostic score to be compared with later scores in order to examine the progress of therapy. However, if time permits using A and B together, and if retesting is to be after three weeks or longer (after which period there is no evidence of any systematic retest effect through having taken the test before), the clinician is strongly advised, in the interests of reliability, to use both forms.[2] Accordingly, two periods of thirty-five to fifty minutes each are needed for this testing. However, several patients can be tested together, with minimum supervision by clerical staff, and obtaining standard scores requires only three or four minutes or less per case, also by clerical help (see Chap. 15 for details).

A first possible use of the questionnaire scores is to continue the categorizing work of the first test interview, if this is desired. Thus by adding the primaries with weights indicated in the handbooks (for 16 P.F.; H.S.P.Q.; etc.), one can (a) get a second and rather more extensive score on the dimensions of both total neuroticism and Anxiety, already measured by the special purpose tests on the first day, and (b) obtain profiles either in first-order or second-order factors which, by the r_p coefficient (31) or the discriminant function (181) can be tested to show to which of ten syndrome groups[3] the patient best assimilates (see Chap. 7). As for point (a) above, Table 4–2 indicates the degree to which normals and neurotics can be separated using the full

[2] The test-retest reliabilities of the full (A and B) scales are not yet comparable with ability tests, and stand at about .60 to .85. However, it must be remembered that, even with both forms, one is only using twenty-six items to measure a single factor, in the case of most factors, and this allotment is a far greater economy of time than the psychometrist usually permits himself, for example, in measuring the intelligence factor.

[3] The standard syndrome-norm profiles are being expanded as to types of category and number in each category (122a), but ten are now available: namely Psychosis in general, Neurosis in general, Anxiety Reaction, Depressive Reaction, Conversion Reaction, Obsessive-Compulsive Reaction, Psychosomatic Disorder, Psychopaths, Sociopaths and Homosexuals. The first two categories are in Table 6–1; the rest are in Table 7–1, except for the data on thirty-three instances of acknowledged but unconvicted male homosexuals, contributed through the courtesy of J. A. Morony, Deputy Comptroller of Prisons, Department of Prisons, N.S.W., Sydney, Australia. The homosexual data were omitted from previous discussion in Chap. 7 because of the possible cultural bias (Australian sample) and because of their recency. However, this evidence is now confirmed by one hundred institutionalized cases of male homosexuals, from the Australian source cited above, and also by a prison sample of American homosexuals, converging almost exactly on the profile of the uninstitutionalized and institutionalized Australian cases. From all this evidence, the indicated male homosexual questionnaire profile is, in stens: $A = 7.6$, $B = 5.9$, $C = 2.2$, $E = 5.5$, $F = 5.2$, $G = 3.8$, $H = 5.5$, $I = 8.3$, $L = 7.4$, $M = 8.2$, $N = 5.3$, $O = 7.2$, $Q_1 = 6.9$, $Q_2 = 6.9$, $Q_3 = 4.9$, and $Q_4 = 6.7$. While this bears *some* resemblances to the general neurotic profile (Table 6–1), there are several crucial differences, notably in that homosexuals have higher warmth or Cyclothymia (A+), more Autistic Non-Conformity (M+), and more Premsia (once called "sensitive effeminacy," I+). They are also more radical and experimenting (Q_1+). As for second-order factors, homosexuals are indicated to be about as Anxious, F(Q)II as neurotics, but much more Emotionally Immature or Pathemic, F(Q)III+, and with somewhat more Promethean Will, F(Q)IV+.

16 Personality Factor test. A linear discriminant function analysis (Diagram 14–1) illustrates the degree of separation possible with questionnaire factors. (Diagram 15–1, p. 463, shows the degree to which discrimination can be achieved on the basis of *objective* test data.) The use of the 16 P.F. to place a patient in relation to standard syndrome profiles, point (b) above, is discussed elsewhere in this book (pp. 134 f. and p. 403).

However, the above addition to, and check upon, syndrome diagnosis is only a by-product of the 16 P.F., which has as its primary purpose an analytic function. To know in just what total personality resources the individual is weak or strong is an essential part of understanding his dynamic problem even though most of it remains to be unraveled by other tests. The meaning of the 16 P.F. factors belongs to general psychology and is constantly growing in precision and range of inference with the growth of general personality research. Brief but probably sufficient descriptions, at least of the factors directly concerned in neuroticism and anxiety, have been given in Chapter 4, and fuller discussions for the student exist elsewhere (44), but some notes, especially directed to the clinician's viewpoint, are in order here.

As a technical point, the calculation of "belonging" to a syndrome or occupation group can always be carried out in three ways: (i) A pattern similarity coefficient, r_p, can be calculated between the factor profiles of the individual and the standard profile for the type (see p. 134). (ii) The weights found by the multiple discriminant function (181) can be applied to the factor scores to see if the summed result exceeds a certain value. (iii) Specification equation weight can be applied to the factor score to predict a criterion of the severity of that type of condition, psychiatrically evaluated.

Approaches (i) and (iii) have been described in detail in connection with vocational counseling calculations (44, p. 772), as "job adjustment" and "performance criterion," but they apply precisely to syndromes, too. The important difference of (ii) from (i), as a typing method, is that (i) scores, as equally inappropriate members of a type, those who undershoot and those who overshoot the type, whereas (ii) gives a higher score in, say, conversion hysteria to one who deviates from normality like the conversion hysteric but also shows the pattern even more than the average patient in this category. The choice of methods will depend partly upon findings on distribution. When Lecky wrote "The Blot upon the Brain" and others joined in the description of the psychopath as a distinct and peculiar type, method (i) would have seemed most suitable. But today we know that the psychopath is distinguished, by methods (ii) or (iii), primarily by high Dominance, E+, low Superego, G−, high Surgency, F+, and Ergic Tension, Q_4+.

DIAGRAM 14-1

SEPARATION OF NEUROTIC AND NON-NEUROTIC CASES OBTAINABLE BY THE 16 P. F. ALONE: FREQUENCY HISTOGRAM OF THE LINEAR DISCRIMINANT FUNCTION FOR 50 NORMAL AND 50 NEUROTIC SUBJECTS ON 16 QUESTIONNAIRE FACTORS *

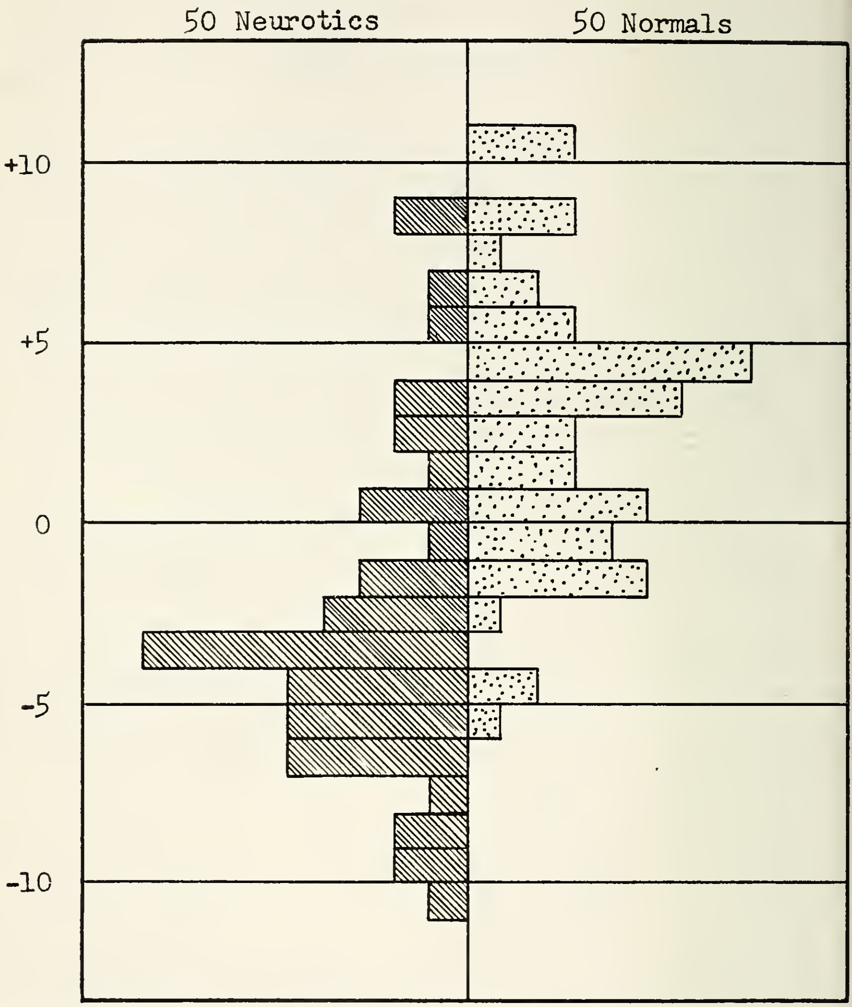

*Diagram 14-1 is a frequency histogram of the linear discriminant function (181) scores for 50 Neurotic and 50 Normal subjects, on the 16 P.F. questionnaire factors. The neurotic cases were selected unsystematically within sub-categories from the available normative pool (see Tables 6-1 and 7-1) and included 15 Anxiety reactions, 15 depressive reactions, 10 obsessive-compulsive reactions, and 10 conversion reactions. There were 29 males and 21 females. The non-neurotic sample included 25 male and 25 female subjects selected unsystematically from several recently received groups of normal subjects. The statistical analysis was performed by Mr. Owen White.

The maximum likelihood cut-off point of zero misclassifies 12 neurotics and 13 non-neurotics or 25% of the subjects. This is substantially poorer discrimination than that obtained with objective tests in another study (see Diagram 15-1). Replicating studies are needed to check on shrinkage and on the suggested discriminatory superiority of comprehensive objective test batteries over comprehensive questionnaire batteries. If confirmed, however, the latter trend will be consistent with our proposition that objective tests reach out into areas of measurement not covered by questionnaires (see p. 77f.).

Since these four factors are normally distributed, it is possible to be both more and less psychopathic than the average diagnosed psychopath, i.e., than the central type. We must accordingly consider psychopathy as a matter of degree, that is, lower or higher degrees of the particular, obnoxious combination of E+, F+, G−, and Q_4+.

Nothing need to be said about the relevance of Intelligence, estimated through factor B of the 16 P.F., since it has long been customary in child guidance clinics to seek to understand the dynamic problem in the light of the school frustrations, etc., ascribable to low intelligence level. By being embedded in a questionnaire, by extreme brevity, and by being untimed, the factor B measurement in the 16 P.F. correlates only moderately with longer and speeded intelligence tests. With children, especially, it should be supplemented by longer intelligence tests. But with adults we have found the B factor estimate from Forms A and B combined quite sufficient to indicate to what degree intelligence may be a problem, e.g., in regard to occupation—except in a few cases where greater accuracy through supplementary testing time is indicated by the first 16 P.F. results in relation to the situation.

For understanding social adjustment and giving guidance on occupational adjustment possibilities, etc., the sten score on factor A (cyclothymia *vs.* schizothymia) is of considerable importance. The high A individual is typically adjusted in social contact occupations—leader, salesman, social worker, teacher—whereas the low A individual may develop a sense of frustration and anxiety if forced from his technical, impersonal interests into these contact activities. Obviously, this information is of value in deciding occupational therapy and adjustment goals.

The level of C, or Ego Strength, is of paramount interest in clinical diagnosis. Rating associations strongly suggest that low C represents an inability to handle emotional impulses realistically, a tendency to be swamped by them, to react with neurotic and even psychotic defenses, and to have a pervasive sense of inadequacy and incapacity to cope with life. A low factor C score should thus be the surest single indicator of a need for prolonged and basic therapeutic treatment, a need to release repressions, and to re-incorporate energy in the integrated self. Our data, in fact, show low Ego Strength to be the most pervasive of factor deviations in mental disorder, appearing in psychotics, psychopaths, and homosexuals, as well as in most neurotic types (Tables 6–1, 7–1, and reference 122a).

Submissiveness E− and Desurgency F− are associated with neuroticism; Desurgency seems more likely to be due to secondary social and physiological effects of the failure and inadequacy of the individual's attempt to adjust. But Dominance-Submission (E factor) has appreciable constitutional determination and a low endowment is better conceived in case analysis as a cause of that initial failure to break barriers which leads to repression of needs. Psychopaths are rather heavily endowed at the opposite poles of these factors (E+ and F+); hence, these particular scores are the most useful in distinguishing between neurotic and psychopathic directions of maladjustment.

The above factors, except possibly Dominance *vs.* Submissiveness (E), are relatively highly susceptible to change and, therefore, to therapy. But, if our genetical study of some five hundred cases (52) is accepted in its conclusions on personality factors, then certain other factors have equally high hereditary determination. The inference is that their measurement should be used to inform the clinician of relatively fixed temperamental features, to be intelligently used rather than altered. For example, high Threctia, H—, with its timidity, shyness, and disinclination to face threatening situations, may explain a good deal in a child. However, this constitutional, temperamental tendency to shy sensitivity normally steadily declines with age (44, p. 615). Nevertheless, in childhood especially, it must be taken into account as a constitutional source of conflicts and adjustment difficulties unknown in high H children and a limiting factor in plans for certain kinds of recreational and other outlets. There is no proof of any substantial shift on shyness through training measures (but see p. 414 for evidence of shifts in the adult).

In addition to factors C, F, and E, which are substantially environmental in origin, the following are predominantly environmental in origin: Premsia (I), Guilt Proneness (O), and Ergic Tension (Q_4), all outstanding is distinguishing neurotics from normals. High Premsia, like its objective test associate (U.I. 16), seems to represent a past family upbringing with indulgent, overprotective, and unrealistic attitudes, and points to the need of substantial areas of relearning and re-evaluation in the daily therapeutic process. High Ergic Tension is best interpreted at present as undischarged instinctual energy, which can be partly temporary and situational, and partly characterological and connected with inner restraints and failures of the ego to obtain expressions for the id. It seems particularly important to measure this accurately in view of its importance for dynamic diagnosis as well as for the light which its changes may throw on the course of therapy.

The further use of these factor scores in both assisting and testing the course of therapy is discussed later (p. 413). To conclude, however, in regard to diagnosis, it will be evident that the skilled clinician, with a nice appreciation of the meaning of the 16 P.F. test factors and knowledge of their varied criterion relations in psychiatric syndromes, education, occupational success, group dynamics, etc. (44, 62, 122a), can derive a wealth of indications from these scores. These bear both on the dynamic problem itself, e.g., through the ego strength and superego scores, and on the personality resources, e.g., schizothymia of temperament, intelligence, dominance scores, in the light of which the dynamic problem must be understood and a readjustment worked out.

Diagnostic use and interpretation of objective test factor scores. Whereas the general purpose personality factor questionnaires—the 16 P.F. and H.S.P.Q.—have already been relatively widely used clinically, thus producing experience as well as research results, the Objective-Analytic (O-A) battery cannot claim any aura of clinical experience, despite the substantial findings by clinical research here set out. This is due to the recency of the O-A and the fact that no norms have been issued during the first five years of its use and the improvement of saturations. This is due also, and perhaps primarily, to the fact that a full four to six hours of testing time are needed for its complete application. Although few clinicians yet give that time to one test (assuming four to six hours *in toto* for diagnosis), nevertheless, if tests existed which gave the desired precision and completeness of information to make therapy 100 per cent more effective, it would be common sense to give this much time for application. Since the evidence here shows that only four (second-order) factors in the questionnaire realm overlap substantially with the O-A battery, the latter is evidently getting out into more than a dozen dimensions of behavior relatively untouched by questionnaires. And it is certain that several of these are strongly involved in neurosis (Table 5–1). Indeed, our research (Chap. 5), shows that the O-A battery, weighting the factors according to our understanding of their role in neurosis, can separate completely, with virtually no overlap, a neurotic from a normal group. The extent of this separation can be seen by a glance at Diagram 15–1 (p. 463) where the maximum likelihood cut-off point in discriminant function analysis of objective test factor data misclassifies only about 7 per cent (normal *vs.* neurotic). Also, the multiple correlation between neurotic-contributory factors and clinical placements as neurotic ranges from about .60 to .90 (see pp. 77 f.).

Although the categorizing value of the O-A for total neurosis is thus already evident, its *analytical* value will be fully developed only after some years of research have related these functional unities to a great variety of clinical and experimental criteria. Only in the case of U.I. 24, Anxiety; U.I. 23−, Neurotic Regression; and U.I. 32+, Invia, do we have well-checked conceptions of what is being measured. However, in many of the remainder we have reasonably well developed hypotheses, e.g., Pathemia, Subduedness, on which clinicians and other psychologists can operate today.

In the first place, if we take from nature-nurture research only the clearest evidence, we can contingently conclude, as with *Q* data factors above, that some of these factors are substantially given properties of the patient's personality as far as the clinician is concerned, whereas others constitute dimensions on which he can work therapeutically with expectation of substantial change. Thus we can conclude, for the guidance of more efficient therapeutic strategy, that one is unlikely to get much permanent therapeutic change in such dimensions as Intelligence, U.I. 1, Comention, U.I. 20+, or Exuberance, U.I. 21+. For example, the reservoirs of that vitality we have called Exuberance seem appreciably fixed by constitution and maturational age, as also does plasticity to cultural demands, or Comention. This is far from saying that nothing can be gained from, or done with, these measures. The skilled clinician will be guided at once by these scores to adjust both therapeutic processes and the goals of adjustment to the individual's intelligence, his vitality, and other constitutional or age-fixed influences. More data are needed, first, to increase the certainty with which we can distinguish these given properties from those which can be manipulated and, second, to learn what each given property means in terms of detailed mode of adaption of the therapeutic process.

By contrast with these given properties, the measures on Premsia, U.I. 16—; Pathemia, U.I. 22—; Neurotic Regression, U.I. 23—; Anxiety, U.I. 24; Rigid Superego, U.I. 28+; Low Adaptation Energy, U.I. 29—; and Invia (Introversion), U.I. 32+, should change with therapy (Anxiety and Introversion are already known to do so, see Chap. 11). Also, the initial scores on these factors can give indications both of the nature of the neurotic origin, in the light of Chapter 12, and the particular areas in which relearning is most demanded. Thus, we have hypothesized that high scores on Premsia and Rigid Superego refer to the extent of maladjustive, or over-exacting attitudes developed far back in childhood, whereas highly neurotic scores on Neurotic Regression (Debility) and Low Adaptation Energy refer more to present states of exhaustion. Relief of the immediate conflict, such as can be obtained often in the adult through the therapist's assistance in more realistic evaluation, or in the child by the social worker's manipulation of the home, school, or peer-group situation, should show comparatively early results in terms of changes of these latter two scores toward the norm. For example, even a vacation from the situation might be expected to shift these components in the neurotic picture toward normality, making for greater effectiveness in the relearning experience involved in subsequent therapy.

However, if our hypotheses are correct, therapeutic changes in Premsia (U.I. 16) and Rigid Superego (U.I. 28) may be expected to proceed only slowly, as the deeply rooted, dependency attitudes of early childhood and the repressions and expediency adjustments responsible for the ego weakness are brought into consciousness and superseded by newly built-up attitudes. The use of the O-A battery in this respect has a purely diagnostic function, analyzing the components in the neurotic background more objectively than by current methods, but the therapeutic procedures indicated are still those of the best current practice. In the therapeutic process, it is true, our results suggest that rather more time should be given to changing a whole range of, say, dependent (U.I. 16—) attitudes associated with an overprotective home environment and to remedying the consequent defective development of self-reliance and responsibility rather than concentrating on any particular traumatic incidents. On the other hand, when Ego Weakness, F(T)II— is diagnosed, nothing is suggested other than the present clinical search for conflicts and repressions which have sapped ego development. However, the Motivational Analysis Test (M.A.T.) scores (see below) and, especially, a P-technique analysis of points of conflict may add objectivity to these finer aspects of diagnosis and aid the standard therapeutic procedures designed ultimately to bring to normality the neurotic level of scores on factors U.I. 16 and 28.

The U.I. 24 Anxiety score has the virtue that it enables us to evaluate the Anxiety level apart from other aspects of the neurotic condition. In the first place, it is possible that Anxiety can be largely not neurotic at all, but situational and realistic. However, experience of chronic Anxiety from this source, superimposed on a mild degree of constitutional weakness (U.I. 21—) or a mild degree of neurotic development of personality (U.I. 16—, 28+), might panic an individual into perceiving himself as severely neurotic. When the Anxiety cannot be accounted for situationally, then the knowledge that its level is high is diagnostically very enlightening.

Further discussion of diagnostic and therapeutic inferences from the O-A would at present require much space, by reason of the constant reference needed to alternative hypotheses and nice evaluations of detailed research evidence, but the clinician who has followed the discussions of Chapters 5 and 12 will see countless points at which useful indications can be gained that are not obtainable elsewhere. However, the greatest utility here is potential, growing with the increasing clinical use of the battery and with the growth of basic personality theory now possible experimentally through the establishing of replicable functional unities.

CLINICAL INTERPRETATION OF THE PATIENT'S SCORES ON DYNAMIC FACTORS. Most of the measurement in this book has been within the framework of general personality factors, since the research successful in producing factorially-structured measurement in interests, attitudes, and dynamic traits has been too recent to admit of our gathering data by its specific application to clinical problems. In theoretical importance, however, this development in dynamics has at least the revolutionary impact for clinical work of the research on general personality factors. It has so far played a small role because of the lack of time for feedback of clinical data just mentioned, and because there is little to add here to what has been quite fully and systematically reported elsewhere (44, Chaps. 11, 12, and 13; and 47, Chap. 8).

Factoring of interest and general dynamic manifestations (50, 56, 61) has yielded solutions which can be brought into tolerable agreement with both pre-metric and independent metric treatments of dynamic manifestations (see 44, Chaps. 12 and 13). This shift of dynamic measurement to more objective techniques shows that (i) the measurement of motivation strength can be systematized far beyond what has previously been possible with crude, projective concepts and physiological measures, and (ii) motivation manifestations are as readily susceptible to discovery of their structure by multivariate experimental analysis as are ability or general personality traits, and, in fact, the number and nature of innate primary drives and acquired sentiment structures in our culture can be settled by this means.

Regarding the first, it has been shown that unitary motivation components can be found among some fifty-five diverse devices for inferring motive strength (44, p. 464), when applied to any attitude or interest regardless of content. Thus research in attitude, interest, drive, and sentiment in this area need no longer depend on mere verbal, opinionnaire statements of motive. Accordingly, batteries of known validity have been built up using the most saturated of the various misperception tests, physiological responses, patterns of reaction time and word association, learning, defense mechanisms, etc., to measure interests and attitudes of major clinical importance.

To avoid entanglement in popular connotations of instinct and drive the nine seemingly constitutional patterns found under (ii) above, in the factoring of attitudes covering the total interest sphere, have been called ergs. They confirm the existence of unitary drives, with goals of sex, escape (fear), exploration (curiosity), narcism, gregariousness, etc., so that the ergic tension level in each of these can be meaningfully, separately measured. Similarly, the level of dynamic investment in a number of unitary sentiment structures, for example, about the home, career, the self, can be measured in these motivational components.

Such measures have recently been utilized in the standard Motivational Analysis Test (M.A.T.) (74), described also in Chap. 15, which chooses for clinical purposes ten demonstrated dynamic factors of high clinical relevance; namely, the tension levels of the five ergs of sex, fear, self-assertion, narcism-comfort and sadism and the investment level in five sentiments, namely, toward occupation, home, self, social-parental sanctions, and wife or sweetheart. The scientific value of this empirical demonstration of the number and form of basic drives (ergs) in man, which the research underlying this particular measurement development gave, needs no emphasis, at least among clinicians. For they have suffered most from the brass instrument experimentalist's attempt over the past twenty years to deny scientific validity to instincts. Thus, over more than a generation, clinicians have insisted on the importance of drives, without being able to point to any systematic, experimental evidence for their existence, largely for the reason that the classical univariate experimental design is incapable of demonstrating anything about complex patterns. By 1960, the nine ergic structures (roughly, drive factors) mentioned above had been replicated in both R- and P-technique analyses (44, 47, 50, 56, 61) and the structures in the sentiment area had also been tolerably clarified. As usual, however, the structure proves relatively complex and, since the practicing clinician cannot afford time for multiple scores that are too numerous, the M.A.T. (74) has been restricted to those five of the nine ergs which seem most important for clinical purposes.

Clinicians have also desired for years to get more representation of the patient's ideological position, including his ideals and sentiments, into the measurement realm. The importance of values has been stressed on the one hand by cultural anthropologists and, on the other, by clinicians such as Thorne (214) and personality theorists like Allport and Vernon (4). Accordingly, the M.A.T. has introduced measures on the strengths of the major sentiments, though these are only in some cases identifiable with value systems, e.g., religious values, and in others are more like the fixations and investments familiar to the clinician. (Unlike the Vernon-Allport Values Test (218) which is based on Spranger's intuitions of categories (208), the Motivational Analysis Test (M.A.T.) concepts are introduced as measurable entities only where unitary factor structures show up in research as major common traits for all people.) Again, there prove to be a number of such socio-cultural fixations of interest, on which most persons can be given a score, but for economy of time, as stated, only the five of greatest clinical importance are used. The upshot is a test—the M.A.T.—using objective type (not self-evaluative) interest measurement devices and yielding ten scores, based on about one and one-quarter hours of testing and requiring about eight minutes of scoring by stencil.

Since the common traits measured here confirm and correspond to notions already long developed and used by clinicians, little need be said about their utilization. However, perhaps it should be pointed out that as far as present evidence goes, the score indicating a given ergic tension level may arise from several circumstances, such as natural strength of drive, high degree of situational stimulation, and, finally, degree of deprivation or thwarting of satisfaction. These components have been expressed in a formula but only additional clinical inquiry can show which influence is most involved (44, p. 546) in a given case. The reader can turn elsewhere (see 44, Diagram 13–1, p. 553) to perceive in some detail the way in which measured ergic tensions respond to certain situational stimuli. The measurement of a sentiment strength would not be expected to vary so much with occasions for these are learned structures. The score expresses, in sentiments, the amount of interest in the object or institution concerned and reflects the amount of reinforcement of the associated attitudes and interests that has occurred in the individual's history.

As stated above, very little direct, empirical evidence, relating these dynamic common trait measurements to neuroticism or Anxiety, has had time enough to become established. There is a beginning in the following findings about the new dynamic traits in relation to other personality measures and to one another: (i) Factoring of ergic tension levels along with Anxiety (U.I. 24) shows that sex drive tension and, to a lesser degree, narcistic sex drive are moderately correlated with Anxiety (fitting psychoanalytic theory) (44, p. 526; 66). (ii) A second-order factor is found among drives and sentiments (44, p. 566) placing high sex and self-assertive ergs at one pole and high sentiment development at the other (religion, self, job). Anxiety correlates significantly with the sex-assertion pole, that is, this drive pattern is correlated with those 16 P.F. factors which express Anxiety and neuroticism (44, p. 526). (iii) The self-sentiment strength, as assessed dynamically by the M.A.T., correlates substantially with the Self-Sentiment Control factor, Q_3, in the questionnaire, as it also does with the dynamic Superego Strength factor, G+. (iv) With these exceptions, however, the new measures of dynamic structure factors are cutting into personality variance which is plainly additional to any yet touched in general personality factors.

Accordingly, it is already possible to supplement the estimate of Anxiety, U.I. 24, of Superego Strength, G+, and Self-Sentiment strength, Q_3, by these dynamic measures. But, for the rest, these measures add a whole new area of measuring instruments to the clinician's resources, permitting for the first time the analyzing of individual sources of ergic tensions, the perceiving of degrees of investment in various sentiments and ideological attachments, and the estimating of degrees of development of the self-sentiment. The idiosyncratic dynamic analysis through the Conflict Analysis Battery, discussed in the next section (pp. 417 f.) should be linked with this use of the Motivational Analysis Test (M.A.T.).

Measurement of Therapeutic Change and Social Work Ameliorations

MEASUREMENT IN TERMS OF COMMON TRAITS. Current faith in therapy rests, for most clinicians, on the self-evident truth of the structural and dynamic insights contained in their systems, as well as upon the general recovery rate having become noticeably better after the advent of psychoanalysis and other psychotherapeutic practices than it was before. The former would be more convincing if the various schools did not so radically disagree on what is self-evident, while the happy fact of the latter is actually questioned today by a number of hard-headed statisticians (see 87, pp. 15–32). If one gives the benefit of the doubt and agrees that a noticeable increase of recovery rates followed Freud, one still must observe that absence of means to distinguish finer differences in recovery rate among various therapies has kept selection and improvement of therapy at a near standstill for twenty years since the historical Freudian, Adlerian, etc., impulses.

Consequently, the immediate value to the researcher of the present access of measurement will be that it permits him to compare two scores, one before and one after therapy. The retesting procedures simply repeat those of the initial categorizing exam and/or main testing appraisal, using parallel forms of the tests, or, if more than a week or two intervenes between testings, the same tests. The therapist can thus check empirically the effects of therapy on Anxiety and neuroticism, as well as upon their individual components, some of which behave differently to threat and therapeutic stimuli than do others (see Chap. 11). A number of precautions must be observed in such research, notably in allowing for the "Hello-Goodbye" effect, that is, the effect of the particular stimulus situations of beginning and ending therapy, regardless of the true effects of the intervening therapy. However, there can be little doubt that the advent of these new, analytical, functionally meaningful measurements places us at the threshold of an era of insight into what therapy does in general and what the particular varieties of therapy succeed in doing.

Some studies have already been made with older instruments, e.g., the M.M.P.I., the Discomfort-Relief Quotient, and tension in written documents by Hunt, Mowrer, Kogan, Light and others (see Summaries in 164, Chap. 18), to evaluate objectively the effects of therapy. As far as we know, however, the first attempt to do so in terms of distinct personality factors is the exploratory study by J. McV. Hunt, Ewing, LaForge, and Gilbert (122) at the University of Illinois. Twenty-five students who came to the Counselling Bureau with relatively severe emotional difficulties were tested on the 16 P.F. before and after therapy. As noted in Chapter 11, application of therapy was associated with a significant drop in measured Anxiety, F(Q)II, and an increase in Extraversion, F(Q)I—, but had no significant effects on the other two second-order *Q* dimensions, Pathemia and Promethean Will. In terms of individual first-order factors, therapy was associated at the .01 level of significance, with a drop in Guilt Proneness (O), Ergic (frustration) Tension (Q_4), Threat Susceptibility or Threctia (H—),[4] and Superego (G+). At the .05 level of significance, there was a decrease in Autistic Non-Conformity (M), and Premsia (I) and an increase in Self-Sentiment Strength (Q_3).

This valuable pioneer research with factored measurements now needs to be extended by increasing the sample size, the range of types of therapy, and of patients studied, etc. The changes found will of course depend on the type of therapy or therapist, the stage of therapy reached (and critical incidents in it), the type of patient dealt with, etc. But even now we have evidence that a therapeutic program tends to affect some components in neuroticism and not others, and that its specific effects are difficult to predict a priori. This again points up the importance of (a) discovering by complete personality measurement, exactly which neuroticism components can and need to be changed in a given case, then (b) developing or selecting from systematic research results, the particular therapies most likely to produce the desired changes along these dimensions. Comprehensive measurement is also desirable in order to weight state and characterological trait aspects of a given dimension properly (see Chap. 9). Thus, some Anxiety components are most prominent as indicators of relatively temporary, fluctuating, reversible change in Anxiety, while others indicate more permanent irreversible trends (see Chaps. 4, 5, 9, and 15). Finally, the use of measures of Anxiety, U.I. 24; Regression, U.I. 23—; Willed Responsiveness *vs.* Low Adaptation Energy, U.I. 29; Rigidity of Superego, U.I. 28+; and Invia, U.I. 32+, after the initial diagnosis is likely to prove very enlightening, not merely about the degree of prior success in therapy, but, also, in guiding further therapy. Changes of Anxiety and Regression, for example, as various situational changes occur, and various resistances are dissolved in the dynamic analysis—are the equivalent of a finger on the patient's pulse. They are likely to offer leads in therapeutic steps that clinical use of these tests will soon make clear.

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[4] Though factor H is heavily determined constitutionally (p. 56), this suggests there is enough environmental determination left for it to be changed appreciably by therapy. Presumably, only the relatively minor environmental component is affected here. Alternatively, it is possible that, first, previous research (52) has overemphasized the degree of hereditary contribution and, second, there are mechanisms, not yet clearly understood, by which environmental pressures, perhaps through physiological effects, can change largely constitutionally determined traits.

Quantitative evaluation of individual fixations and conflicts. Although most of our contribution here has been at the common trait level, we have agreed that, in the last resort, the clinician must have these general and dynamic common traits measures supplemented by objective evidence of individual conflicts and idiosyncratic attachments. For it is upon these that the therapist must work to produce many of the changes in the general personality dimensions. In our view, dynamic re-education is not only digging out and reintegrating these conflict experiences, as is frequently supposed. It is also a matter of rebuilding whole sets of attitudes to life, such as those involved in the overprotected childhood and the resultant dependent attitudes, and many other faulty attitudes in meeting conflict, etc., all of which need re-education. Some clinicians may well place too much emphasis on the dramatic and anecdotal aspects of the personal history. But it is probable that the most effective therapeutic relearning, though it may start with dreams and the reliving of particular trauma, merely uses these occasions for repeated re-evaluation of generally faulty habits of interpretation and the extinction of maladaptive attitudes. Nevertheless, it is important to know where the specific existing personal conflicts lie and to know this with greater certainty than is possible by free association and similar qualitative procedures.

The method of P-technique, in its general aspects, has been touched upon at several stages in this book, notably in Chapter 9, where, along with incremental R-technique, it was used as a means of discovering the dimensions of state change, when individuals are repeatedly tested with the same variables; and on page 397 of this chapter, where its indispensable role in discovering the unique trait structure of an individual was discussed. Our present discussion of P-technique as a practical device for measuring therapeutic change builds upon the principles in the previous discussion of it as a diagnostic tool for idiosyncratic, symptomatic structure. The reader may be reminded that in the clinical context its chief utility is in the dynamic field and that its procedure is to apply the same set of about twenty objective attitude, interest, and dynamic measures, for fifty days (see 44, pp. 857 ff. for listing of such repeatedly applicable devices), to the same patient. Since the individual's drive strengths and (to a lesser extent) his sentiment attachments fluctuate from day to day with circumstances, trauma, and internal re-adjustments, the attitudes involved in any one erg or sentiment will change together and correlate positively in level over the succession of days. Indeed, as has been shown, if the variables are intercorrelated (over time) in every possible combination and the resulting personal correlation matrix is factor analyzed, it will reveal ergic and sentiment structures which center upon, and are essentially the same patterns as, those found as common traits for people generally, by R-technique. However, the patterns, though recognizable as certain particular ergs by the marker variables that have been put into the examination from the common R-technique structure, will also have loading emphases that are unique and will admit even entirely new attitude variables which played no part whatever in the common trait pattern.

Naturally, before the systematic P-technique study is begun, the therapist will need to carry out, by his accustomed interview techniques, what we have called a "reconnaissance test." The object of this is to prepare a brief list of symptoms and attitudes which he suspects are vital to the dynamic problem. Some five to ten of these would be rated or measured each day along with the twenty markers. The resulting type of structure which one may expect to find can be illustrated by Table 14–1.

TABLE 14–1

Illustration of Dynamic, Ergic Factors Emerging from P-Technique, with Common Markers (M) and Unique Fixations (Symptoms, S)

1. Attitude Loading Pattern on the Sex Erg

M	I want to fall in love with a beautiful woman.	.5
M	I want to satisfy my sexual needs.	.5
M	I like a novel with a love interest and a ravishing heroine.	.4
S	I have an impulse to shoot the sergeant.	.4

2. Attitude Loading Pattern on the Fear Erg

M	I want my country to get more protection against the terror of atomic attack.	.5
S	I do not want to go near water.	.5
M	I want to see the danger of death by accident and disease reduced.	.4
M	I want never to be an insane patient in a mental hospital.	.4

Here the three markers that would be expected from common factor structure enable the individual's sex and fear drives to be recognized as such, while further the analysis places the dynamic origin of the two attitudes which trouble the patient as irrational compulsive and phobic symptoms. The ergic origins of these reactions to tensions have only been suspected by the clinician, but are now shown to derive respectively from sex and fear. Possibly the impulse to attack the father surrogate sergeant may therefore be traced to an oedipal childhood situation.

The clinical use of P-technique is two-fold: (a) to permit a daily calendar plot of ergic tension levels, so that tensions may be related to events in life and in the clinical analysis. This, however, is only a by-product, for it could be achieved more easily by the direct use of the Motivational Analysis Test (M.A.T.), adapted to repeated administration, and (b), the main use, to permit the recognition of the sources of unique symptoms and conflicts.

The use of this method for symptom analysis will be evident from what has been said, but its use in exploring basic conflicts requires that we refer back to, and further develop, the factorial representation of conflict first stated in the previous chapter (pp. 363 f.). Therein it was recognized that a stable, insoluble degree of ergic conflict in an established attitude (existing course of action) is indicated by coexistence of positive and negative signs in the ergic specification equation, as follows:

$$I_a = S_{a1}E_1 - S_{a2}E_2 + S_{a3}E_3 + \cdots$$

where: I_a is the strength of interest of the individual in the attitude *a*; the *S*'s are the situational indices (loadings) obtained by the P-technique examination and analyses, and the *E*'s are the strength of various ergs. As brought out more fully elsewhere (44, Chaps. 11–13), the fact that S_{a2} comes out negative and S_{a1} and S_{a3} positive means that this interest I, in the course of action *a*, expresses ergs E_1 and E_3 at the cost of repressing or suppressing E_2. The amount of conflict in this system may thus be expressed, percentage-wise, as

$$C_a = \frac{S_{a2}}{S_{a1} + S_{a2} + S_{a3}}$$

This states the fraction of energy lost by conflict in a particular attitude or dynamic system *a*. As such it enables us to trace the ergic roots of that particular conflict. But the clinician may also be interested in deriving an index, from this objective basis, of the total extent to which a given patient is suffering from conflict in all his dynamic adjustments. In theory he can do this by taking a truly representative sample of the chief attitude-interests of importance to the individual in our culture. Applying these by P-technique he can work out the loadings for this standard set. This estimate of the total conflict experiences by the individual in his total (sampled) dynamic attachments can be written as an index of Conflict, C, as follows:

$$C = \frac{\Sigma_s^-}{\Sigma_s^+ + \Sigma_s^-}$$

where Σ_s^- means the sum of all negative loadings and Σ_s^+ of all positive, the signs being neglected. The recent work of Williams (223) has shown that this index, and certain derivatives of it, (a) correlates at a $P < .01$ significance with psychiatrists' ratings of severity of conflict, (b) correlates at $P < .01$ with measures of the Ego Weakness and Ergic Tension questionnaire factors, and (c) has a significance of association with division into normals and mental hospital cases, by the Mann-Whitney test, of $P < .01$. (See Table 13–3.)

The promise of this theoretically clear evaluation of conflict in terms of ergic cancellation is thus very great, by the verdict of experiment. Nevertheless, it is not possible without more space than we have here to discuss its theoretical meaning in relation to concepts of adaptation, integration, and adjustment (44). Contingently, we have defined Integration, I, as

$$I = 1 - C$$

The practicality of P-technique in routine clinical work is open to debate—and improvement. In the experimental model of the Conflict Analysis Battery developed by Cross, Sweney, Williams, and Cattell (223), only some fourteen basic attitudes are tested, though Sweney's work, now in progress, is more ambitious. In any case, a preliminary reconnaissance test needs to be given, by this or ordinary consulting room, free association methods, before the Conflict Analysis battery per se, to determine the principal areas of conflict, and the troublesome symptoms to be introduced. Possibly half a dozen of these will be introduced, bringing the total number of attitudes for daily testing (ergic markers plus specific symptoms) to between twenty and thirty. One might also wish to correlate in situational measures, including specific activities of the psychologist in the process of therapy. The possibilities for the emergence of radically more insightful and controlled therapeutic techniques are considerable.

The busy clinician will necessarily raise the question whether this is being proposed as a presently practicable routine procedure or as a new step in clinical research. The answer is, primarily the latter; but, if a routine case is important enough (and time and money permit) surely fifty sessions of rather more than an hour a day, such as the indicated battery requires, is not excessive. If it is what would normally be a 200-hour case, perhaps fifty or sixty hours spent in efficient diagnosis (including the above indications of response to therapy) could actually reduce the required total to 150 hours. From the clinic's point of view, the important thing, moreover, is that this is not fifty hours of a high-level therapist's time but only of supervision virtually at the clerical level. Indeed, if the method is fully vindicated, it would not be impossible to invent a machine to do the administration and scoring. This is already possible for the analysis, by the electronic computer, into which the patient's 30 × 60 score matrix could be fed and the oblique simple structure dynamic resolution obtained in about twenty minutes.

Obviously, the method needs to be given a thorough clinical research survey before its best, most convenient routine use can be achieved. But the objectivity, dependability, and reproducibility of diagnosis (as among different therapists), which the method inherently commands, might reasonably cause some progressive clinicians to introduce it on important routine cases without unnecessary delay. However, to avoid overestimates of what the method can do, it should be emphatically stated that, except for the situation where therapy variables are introduced, it is a method of diagnosis, not of therapy. Where the attainment of self-insight is regarded as part of the therapeutic system, the patient still must be led to it. But instead of two people groping their way to the truth, one (the analyst), at least, has by this method a sharpened perception of the nature of the conflicts and resistances through which the patient must be guided. In short, P-technique is theoretically capable of completing the clinical measurement on common traits, by adding to the unique combination of scores on the common factor measures, further analyses of the unique dynamic factor fixations and conflicts. These, the therapist needs to tackle along with, and as part of, whatever re-education can be effected in the common factor personality profile.

PERSONALITY MEASUREMENT RELATED TO SOCIAL WORK AND SITUATIONAL CHANGE. The manipulation of the patient's situation, as a means of relief or of therapy, plays vastly different roles in different therapeutic systems and has typically been greater in child guidance clinics than in the classical psychoanalytic treatment of adults.

It is not in our province to debate how much manipulation could profitably be introduced into adult therapy, and it should be assumed, therefore, that the following applies less debatably to children, in whom the formation of unhealthy personality structures is actually proceeding at the time, under the pressure of familial, school, or other situations. The increasing emphasis on scientific, insightful manipulation of the life-situation really requires three things: (a) a development of a taxonomy of emotional situations, such as we discussed in Chapter 13; (b) an objective system for testing the attitudes of parents, siblings, teachers and others, in respect to the given case—this includes the atmospheres created around him; and (c) the measurement of personalities of parents or others persistently interacting with the child.

In regard to (a) above, some notions have been presented. Point (b) does not fall within the province of present methods, though we mention the intra-familial attitude scales developed for social workers in the Cambridge-Somerville Youth Study by Cattell and Cabot (54), the factor analyses of family atmospheres by Baldwin (7, 8), and the recent positive findings on family attitudes and child problems by Becker, Peterson and co-workers (13, 173). It is upon point (c) above that we shall concentrate, because the possibilities in the social work area from the developments of personality measuring instruments here described have perhaps not been generally perceived.

Usually, the therapist attempts to have a few interviews with the parents of disturbed children, in which, as is well known, he is often tempted to transfer his efforts at therapy from the child to the parent! In other clinics or cases, he may depend for evaluation of the home influences upon the psychologically trained social worker. In either case, his focussing of the parental or sibling personalities is less clear than that which he achieves with the patient and is likely to be more sketchy and erratic. The possible contribution of the present approach is the provision of tests, which consume far less time than is now usually devoted attempting to evaluate the parent and siblings, and which can provide a reasonably accurate picture, *in the same dimensional constructs employed in studying the patient himself.*

Naturally, sufficient interview time must first be given to establish the rapport that will persuade a parent to take a questionnaire or whatever other test is used. But the experience of the first few clinics to experiment with this approach shows it has not been difficult. The most promising tests would appear to be the 16 Personality Factor Test (16 P.F.) and the Motivational Analysis Test (M.A.T.), and their counterparts for child siblings (the H.S.P.Q., the C.P.Q., the E.S.P.Q., and the P.S.P.Q.). By kind permission of Dr. Samuel Karson, we reproduce in Table 14–2 some of his 16 P.F. results with parents of clinical cases.[5]

It is at once evident that, as clinical theory has long supposed, the parents of these behavior problem children depart significantly from the general adult population on several personality factors. The deviations which surpass the one per cent level of significance simultaneously for mothers and fathers show the parents of clinic children to have lower Ego Strength (C−), greater Autia (M+), and greater Ergic Tension (Q_4+). In terms of second-order factors they are both more Anxious and more Introverted than adults generally, but at the same time they are lower on Superego Strength (G−) and strength of Self-Sentiment (Q_3−). In general, the parents have an average 16 P.F. profile which

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[5] Dr. Karson (Assistant Director, Dade County Child Guidance Clinic, Miami, Florida) is preparing several publications in which he will analyze and discuss these and similar data in more detail than is possible here.

TABLE 14–2

PERSONALITY PROFILES OF MOTHERS AND FATHERS OF CHILDREN BROUGHT TO A CHILD GUIDANCE CLINIC

	16 P.F. Test Personality Trait	Mean Sten Scores*** in Terms of General Adult Population (Population Mean = 5.5)		t-Value of Difference from General Adult Population	
	Low Score vs. *High Score*	*Fathers* N = 69	*Mothers* N = 69	*Fathers*	*Mothers*
A	Schizothymia *vs.* Cyclothymia	6.3	5.6	3.2**	.4
B	Low *vs.* High Intelligence	4.1	5.0	−4.4**	−1.5
C	Low *vs.* High Ego Strength	4.0	4.9	−5.1**	−3.7**
E	Submiss. *vs.* Dominance	4.3	4.6	−3.9**	−2.2*
F	Desurgency *vs.* Surgency	3.4	5.3	−9.6**	−1.0
G	Low *vs.* High Superego	4.8	5.0	−2.9**	−2.3*
H	Threctia *vs.* Parmia	4.9	5.6	−2.4*	.4
I	Harria *vs.* Premsia	6.9	5.6	4.8**	.5
L	Trust *vs.* Protension	6.4	6.0	3.3**	2.3*
M	Praxernia *vs.* Autia	6.6	6.1	3.7**	2.7**
N	Naiveté *vs.* Shrewdness	5.1	5.7	−1.5	1.0
O	Low *vs.* High Guilt Proneness	6.6	6.0	4.3**	2.0
Q_1	Conserv. *vs.* Radicalism	5.1	6.1	−1.3	2.4*
Q_2	Dependence *vs.* Self-Sufficiency	6.3	5.1	3.2**	−1.7
Q_3	Low *vs.* High Self-Sentiment	5.1	4.4	−1.6	−4.7**
Q_4	Low *vs.* High Ergic Tension	6.9	6.2	5.0**	3.0**

* = Significance at $P < .05$

** = Significance at $P < .01$; underlined when both same sign and $P < .01$.

*** The t-value for a given factor does not exactly parallel its amount of sten deviation from the population mean, since the sten variance within the father and the mother groups varies from factor to factor. The 69 mothers were contrasted with 803 adult women in the general population 16 P.F. standardization sample, and the 69 fathers with 341 adult men in the general population standardization sample (62).

distinctly resembles the standard one for 201 clinically diagnosed neurotics (Table 4–2). This resemblance is much more marked for fathers than for mothers, although in neither case does the profile show as marked a deviation from the normal as does the standard neurotic profile. Our primary purpose in calling attention to these findings is to demonstrate that (i) a well-known child guidance clinic finds it entirely practical to get a comprehensive objective evaluation of the family personality background by such brief tests, and (ii) highly significant parental personality deviations, some obviously to be expected, others suggestive of new theories, exist in those constituting the social environment of the problem child. (In a sense, parental personality comes under the heading of a life-condition influence, as discussed in Chap. 11.)

As research with the 16 P.F. and the M.A.T. proceeds in clinics along these lines, we may expect to discover laws of a more specific nature regarding child problems and parental personality. The routine availability of brief and practicable personality and dynamic factor measures, applicable to the rest of the family of a child with problems, will then presumably facilitate the decisions of the psychiatric social worker on the objectives for each case.

Wider Implications for Therapy

Most of our attention has been directed to improving diagnosis by measurement, on the assumption that current diagnostic techniques can be improved by functional measurement and that quantitative, analytical help of this kind is necessary before therapy itself can advance. However, although our contributions are so far mainly restricted to diagnosis, we would not wish to overlook two things, namely, that diagnostic information always has therapeutic implications and that, on the basis of recently developed measurement-diagnosis techniques, we have been able to mount a few direct research forays exploring the area of therapy. The chief resulting implications for therapy are drawn below. Some points consist mainly of a re-orientation or extension of propositions already made about diagnosis:

1. The entire personality tends to be involved in the determination and expression of a given patient's neurosis or Anxiety. Therefore, therapy must be guided by the broadest possible coverage of personality measurement. This is necessary if the therapist is to be aware of the exact personality components which can and need to be changed, the personality resources which can be mobilized to facilitate recovery, etc.
2. Related to the above is the point that the same total severity of disorder can be contributed to by varying combinations of personality components in various persons. Each of these components needs to be separately measured and understood, since each behaves differently in response to environmental stimulation. At one extreme, some characteristics are almost completely unsusceptible to normal environmental manipulations, functioning rather as "givens," for constitutional or other reasons. The therapist must first of all distinguish that which he can change from that which he cannot. Among the former, he must then realize that no two components react in exactly the same way to environmental pressures and that a neurosis may be "reduced" in various ways.
3. As noted above, the reaction of one component in neurosis (or Anxiety) to a given stimulus can by no means be predicted from the known reaction of another component to that stimulus. Chapter 11 has shown that one must be extremely wary in attempting to predict response effects from knowledge of the stimulus situation applied. For example, a stimulus which looks anxiety-provoking may turn out to be capable of lowering Anxiety. We have also found that a

state or personality change is generally factorially mixed; stimuli tend to scatter their effects along several response dimensions,[6] following what might even be called a "multifactor theory of stimulus effects."

These findings suggest that research upon, and routine examination of, therapeutic progress needs to be formulated in terms of change considered simultaneously on the several dimensions in which neurotics deviate from normals. Thus it is possible that some therapeutic steps will improve one and not another factor, or that some deviations must get worse before they can get better.

4. An approach recently favored in some circles is to proceed directly to therapy, de-emphasizing or totally omitting the intervening steps of diagnosis or, at least, reducing diagnosis merely to a set of propositions concerning the category of therapy required. If the advocates of this position mean that the behavioral characteristics of the patient can be neglected, in a direct jump to the selection of the relearning situation needed, we must disagree. It is first necessary, in order to talk about therapy in neurosis generally or even about a particular case, to know in what dimensions the personality is abnormal and what deviations must be remedied. Therapy also presupposes that, as in (3.) above, we are informed of the empirical relationship between these dimensions of deviation and various types of conditions and learning situations.
5. Precise, standardized measurements of neurosis and Anxiety will facilitate stable, checkable research upon, and better utilization of, therapeutic techniques. When a clinician or experimenter finds a certain relationship between therapy X and reduction of neurosis, as measured by a standard, meaningful test, other clinicians and experimenters will be able to know and check exactly what these effects are. That is, the proposed relationship will be publicly verifiable. If it fails to hold, the reasons can also be publicly verifiable (in the type of sample, range of situational variation, etc.) and not remain obscured forever in differing subjective concepts of what neuroticism or Anxiety is. Thus, in this manner only is growth of a systematic, analytical body of information on the effects of therapy possible.

The position reached at this point may be summarized by saying that analytical measurement is necessary: (a) for reliable, consistent diagnosis; (b) for evaluation of therapeutic procedures and systems; (c) for guiding therapeutic tactics as they unfold in the individual case—this is by no means an assertion that therapy was never achieved before functional measurement became possible! The good clinician constantly evaluates various trends in response to therapeutic steps, but heretofore he did so subjectively and with estimates of low reliability—and finally, (d) for effective communication among clinicians concerning what they are treating and what theoretical relations they believe to exist.

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[6] Such a generalization may need qualification and is based here mainly on the experimental demonstration in Chap. 11, namely, that challenge and threat stimuli decrease many of the components in neurosis and Anxiety. One promising lead to be investigated (see Chap. 11) is that a graded stress therapy will help to alleviate certain aspects of neurosis and Anxiety. Presumably this occurs because such repeated challenges educate the patient to deal with the stresses before which formerly he has crumbled and/or by focussing his attention on concrete problems in the environment rather than, excessively and morbidly, upon himself. Research on these possibilities needs to give careful attention to the type and intensity of stress used and to the identification of personality characteristics requiring change (for, of course, some neurotic-contributors are increased by stress).

6. Even our existing, partial understanding of the nature of the various personality dimensions on which neurotics are significantly deviant is enough to give us a start in looking for the kinds of therapeutic procedures which might rectify these deviations. For we have some knowledge not only of the types of behavior which load these factors, but also some hypotheses and experimental findings on their criteria relations and their etiology. For example, the hypothesized role of overprotection in generating Premsia, U.I. 16−, of early Oedipal difficulties in Rigid Superego, U.I. 28+, of current exhaustion from conflict in lowered Willed Responsiveness (or Low Adaptation Energy), U.I. 29−, and of the various physiological associations demonstrated for Effort Stress and Anxiety factors—all these indicate promising avenues for therapy.
7. In pursuit of this same optimal linking of therapeutic procedures to deviations of specific unitary traits, much may be gained by seeking to translate current clinical experience now associated with particular syndromes into propositions regarding effective sources of dimensional changes. This requires alignment of syndrome concepts with factor-profile patterns, as initiated here in Chapter 7. For therein we showed that though psychiatric syndrome placement of patients can be notoriously unreliable, a central tendency of profile unique to each syndrome can be found. In this chapter, statistical methods were described for scoring the exact degree to which a given patient fits these syndrome types. With this more dependable assignment of patients to syndromes, by degrees rather than categorically, the clinical lore connected with therapy and prognosis of types could be translated into testable propositions about personality factor devitions and therapy.

Summary

1. The clinical uniqueness of the individual patient is expressible partly in terms of his particular combination of scores on common traits, measured in the same way for everyone (Intelligence, Anxiety, Extraversion, etc.). Partly, however, it must be expressed in terms of particular dynamic fixations and conflicts in dimensions along which it is unprofitable to have tests standardized for everyone and which are properly measured in a system of unique traits. These are accessible by

P-technique factoring of the individual, showing where each drive has achieved its individual expression or fixation and has sustained conflict peculiar to the individual.

2. In the past, clinical diagnosis has concerned itself with categorical all-or-none syndromes, with intuitive evaluation of free association phenomena, and with test-centered measurement procedures. Now it is becoming possible to apply functional, trait-oriented measurement. The clinical expert can use therein a repertoire of testing procedures of known construct and clinical validity, centered on concepts of confirmed personality structures, general and dynamic.

Such tests are available, in both questionnaire and objective test form, for the main common traits in personality and ability relevant to clinical work, also for states and for the marker variables needed for P-technique examination of unique traits.

3. The main purpose of such tests is an analytical understanding of the total personality for diagnosis and therapy, but these profiles also permit calculations of the degree to which the individual belongs to various syndrome groups, the degree of total severity of neurosis, etc. These uses provide measures which, in turn, enable the clinician to utilize lore already established for syndrome categories.

4. For purposes of clinical research, routine diagnosis, and guidance of therapy the available and necessary testing procedures are four kinds:

a) *General Purpose Tests,* the comprehensive, multi-factor batteries for blocking in the total personality, both in terms of general personality factors (16 P.F. and O-A batteries) and of dynamic factors (the Motivational Analysis Test—M.A.T.). These may be as short as a half-hour for questionnaires or extend to six hours for a complete (18-factor) objective test battery.

b) *Special Purpose Tests,* which present certain exact combinations of factor scores in brief, rigid tests, designed and prescribed for one particular use and criterion only, for example, degree of neuroticism or Anxiety.

c) *State Level Tests,* patterned to give maximum information on states rather than traits and fitted for repeated administration, either in themselves or as a series of forms.

d) *Dynamic P-technique Batteries,* for administration fifty or more times to the same individual, but differing from (c) above in being analytical, by a combination of markers with measures of the focal symptoms, etc. States can be plotted from this approach but the primary aim is to reveal idiosyncrasies of dynamic expression, conflict, and specific attachment. Such batteries also yield C, an index of total conflict in the individual. The practical use of this index will depend upon new developments in electronic computing aids.

5. The maximum, strategic utilization of tests in clinics calls for (a) an initial *categorizing examination* of about an hour, with brief, special purpose tests, to decide roughly the nature, severity, and therapeutic need of the given case; (b) a *main testing appraisal,* using comprehensive, multi-factor general purpose batteries, covering general and dynamic trait levels; (c) a *therapeutic tactical guidance testing,* by repetition of the main diagnostic batteries, along with state measures of Anxiety, etc., at suitable intervals in therapy—by recording response to conditions and to therapeutic steps, this aims to guide tactical moves and evaluate gain and readiness for conclusion of therapy; (d) if circumstances permit, the use of a *Conflict Analysis Battery* in a P-technique procedure. The choice of the non-marker attitude variables in this must depend on a reconnaissance test (see paragraph 7, below).

6. The use of multiple-source trait batteries presupposes the importance of knowing as much as possible about the total personality as well as the special emotional conflicts. Such an analytical presentation of the main resources of the personality, dynamic and non-dynamic, is desirable in order (a) to perceive what constitutional deficiencies may have augmented the neurosis, (b) to see what are the possible and hopeful adjustments at which to aim in the light of the person's resources in terms of constitutional or long stabilized traits, (c) to detect, by ergic tension measures, the drives and sentiments encountering most frustration, and (d) to make possible later a measure of improvement on those personality factors amenable to therapeutic change.

7. As mentioned under 5(d) above, an important possible procedure is the application of a Conflict Analysis Battery, consisting of about fourteen attitude measures to mark the principal ergs and six, or so, symptom measures from an initial reconnaissance of the principal conflict problems in any given case. A P-technique measurement on some fifty occasions, followed by factorization, has been shown to yield quantitative statements of the particular conflicts and a total conflict index, C, which supplements other measures of the severity of the individual's maladjustment. Through the electronic computer programs becoming available, this may soon be a practicable routine procedure whenever fifty hours of client time can be depended upon.

8. Our major research and practical propositions, resting on the statistical significance of present findings, concern diagnosis; but these necessarily have implications for the conduct of therapy, and already some direct data on therapy are available. Therefore, certain tentative general possibilities in the use of these measures for therapeutic guidance are discussed.

So far no sufficient sample has been gathered to establish the typical changes on objective test factors in the course of therapy. But on factors measured by questionnaire, an exploratory study indicates that therapy decreases Anxiety, increases Extraversion, decreases Guilt Proneness and has significant effects along several other personality dimensions.

9. By reason of the ease and simplicity of administration of the multi-factor questionnaires, they present a new possibility of adding to that part of diagnosis (and, therefore, of treatment) which comes from a psychological social worker's examination and manipulation of the patient's social environment. Measures on siblings, parents, etc., can be made on the same functional unities in personality as those of the client. Recent use of this approach shows statistically significant divergencies in the personality of parents of problem children, as contrasted with parents in the general population.

10. The above propositions for progress in routine clinical examination procedures are presented partly as (a) practices which, although recent, have the experience of clinical practicality as well as research clarification. These include use of the 16 P.F., H.S.P.Q., etc., questionnaires for Anxiety and total neuroticism measurement, etc., and are directly assimilable in routine work, with norms, criterion relations, etc.

These propositions for clinical use are also (b) practices supported by research but too recent to have yielded routine experience. In this category we find P-technique analysis, so far used in only a few published researches on clinical cases, and the M.A.T. and the O-A batteries, for which standardizations are only now in progress. Procedures in this second category are therefore presented for pioneer and experimental clinical use; at present, equipment for their practical application exists in only a few clinics. However, Chapter 15, following, supplies some particulars for the use of these tests.

CHAPTER 15

PARTICULARS ON THE AVAILABLE MEASURING INSTRUMENTS

Purposes, Limitations, and Promise of Tests Listed

As stated at the opening of Chapter 14, some may prefer to obtain test particulars in the present chapter before reading of their application in Chapter 14. The present order is retained for those who wish first to perceive the setting which defines the types of test needed (Chap. 14) and then to examine the actual catalogue of test instruments available.

For those choosing to read Chapter 15 first, it may help to summarize that Chapter 14 has been concerned with the selection of desirable tests and the interpretation of test results in regard to diagnosis and etiology and the determination of the tactical direction for therapy. It has stressed that, although special purpose tests revealing the severity of particular pathological conditions or, perhaps, the degree of correspondence to particular syndrome diagnoses may be valuable, the main purpose is the analytical measurement of the total personality. A disease does not exist *in vacuo,* but as a condition of a highly complex organism. Though psychosis may be, as it were, imposed on a personality, the expressions are better understood if one knows the kind of personality attacked, while in the case of neurosis it is relatively correct to say that it *is* the personality. In the realm of traits, these analytical measures cover (a) general personality dimensions (including ability), by questionnaires or objective tests, and (b) dynamic structure factors, by objective tests. In the realm of states, these analytical measures concern Anxiety, Stress, Pathemia, and half a dozen others for which measures exist only in the research literature.

A word is necessary about the general standards by which tests for various purposes are to be judged. Cattell has discussed these systematically elsewhere (44, see especially Chap. 9), pointing out certain issues in current thought and arguing against over-concentration on ideals of test homogeneity and internal reliability. The upshot of too much persistence in this itemetric, historical groove is that some test users overvalue reliability and magnitude of sample used in standardization and undervalue concept validity. Also, it does not seem to be generally realized that there are a dozen different conceptual meanings of reliability (44, p. 352)—quite apart from the various formulae by which each can be worked out—and at least four different meanings of validity (44, p. 334).

Our primary meaning of validity here is not culturally specific performance validity, but construct validity—or, as we would prefer to call it, concept validity. This concept validity may be defined as the correlation of the test with the uniquely, factorially defined concept which it is designed to measure. The correlation of the pure factor score with a particular cultural performance, as in the correlation of, say, U.I. 24 with neuroticism, is by no means all of its validity, for Anxiety correlates with a million diverse cultural phenomena, no one of which can be called *the* criterion.

In the present book, the major object of research in basic personality measurement, prior to the applications of those measures to clinical problems, has been to achieve concept validity. This is a more difficult goal than merely preparing a scale to have high validity against a particular rating or criterion. Consequently, the numerical values achieved do not compare favorably with those of simpler criterion validities, but the wonder is, perhaps, that significant validities on such complex personality aspects have been achieved at all. In the objective test field, for example, factoring of over seven hundred test designs has yielded only about sixty with good personality concept validity. At the very least, it can be positively said of our Objective-Analytic (O-A) battery that no other tests have been published which reach the levels of concept validity which these attain.

Of the various meanings of reliability (44, p. 352) we shall discuss the four most important: (a) the stability coefficient, when retests are made over an interval with the same instrument, (b) the dependability coefficient, in an immediate retest, (c) the equivalence coefficient, when two forms of a test are compared, and (d) the homogeneity coefficient. Of these, only the dependability coefficient should be high, as a condition of good test usage, for a low stability coefficient, relative to the dependability coefficient, means only that the trait measured, e.g., Surgency-Desurgency, varies in the person from occasion to occasion and this is no reflection on the test, while equivalence and homogeneity may justifiably be low for reasons given below. However, with the same general type of test, such as a questionnaire, variations in the dependability coefficient for tests of the same length are so negligible as to be meaningless.

Turning now to the equivalence and homogeneity coefficients, which are degrees of the same thing, since the former compares two halves and the latter, smaller item particles, it may be true that homogeneity is desirable in some scales but it is not a necessary condition of a good factor scale. Good sub-tests in a factor scale should (a) load as highly as possible on the required factor, and (b) load oppositely, in order to get suppression, on the factors which account for the rest of their variance. At the present stage of research, it appears likely that too pure a factor measurement may have poor hardiness and utility (see 44, p. 799) for shifting from one sub-culture or testing situation to another, and that sub-tests using suppressor action would be desirable even if more homogeneous measures could be found.

Incidentally, the fundamental principle here has been realized intuitively for a generation by psychologists, for example, Stutsman in the Merrill-Palmer Test, who sought tests for a battery for trait X which would be as diverse as possible while still showing correlation with the required criterion. Humphreys has expressed this ideal of good multiple correlation (low mutual correlation: high criterion correlation) in his index (see 44, p. 356)

$$r_v = \frac{\bar{r}_{ic}}{\bar{r}_{it}}$$

This is one reason, since factors are practically orthogonal, why better cultural criterion prediction ensues from factor tests than the same number of non-factor tests. And it is also a reason for being quite undisturbed, or even self-congratulatory, if one's items or sub-tests, proven by factor analysis to load the required factor, are shown by homogeneity tests of the given factor scale to have near zero correlations with one another.

A second issue concerns standardization. In our opinion, awe of a vast standardization number is sometimes misplaced. Let us suppose that a 13-item scale as in, say, factor H of one form of the 16 Personality Factor (16 P.F.) test has, on an infinite population standardization, a mean of 9 and a sigma of 3. (Each of 13 items can score 0, 1, or 2, and the possible total range is 0 to 26.) If the mean had been established on only four hundred cases rather than an infinite number, there would be only one chance in a hundred that it would exceed 9.38 or fall below 8.62. Since this error falls far short of shifting the individual to the next raw score digit, it is of small importance for individual clinical work.

To sum up, we urge that the demonstrated concept validity of a test battery is by far its most important characteristic and that the overvaluation of reliability coefficients and the magnitude of the host on which standardization has accumulated, is misguided. Of course, it is best to have both concept validity and good standardization. But, in our view, if one must make the choice, it is better to employ and improve upon an otherwise good test without a large standardization rather than to persist in utilizing a test of 0.9 reliability and 100,000 standardization which measures, with the greatest of accuracy, practically nothing of import.

Accordingly, it will be understood that, in the use of few tests like the Objective-Analytic (O-A) battery (73), the clinician is urged to obtain his own control or normative group, locally matched. This battery is, in any case, being revised by Damarin and Warburton, to improve the concept validities of tests on all factors. Of course, gathering a standardization sample cannot take place until these more valid (concept) tests have been made ready on all other particulars. Most other tests described in this chapter have adequate to good standardizations.

This digression into principles of psychometric evaluation is necessary before studying the particulars of the various tests, since they are all factored tests. The reliabilities expressing internal homogeneity and inter-form agreement will therefore not be as high as in highly specific scales, and to appreciate the real validity of the tests one should examine the original factor analyses. Furthermore, the psychologist should recognize that, first, among these new tests—the first to reach out successfully to identify functional unities—some batteries, notably the Objective-Analytic (O-A) and the Motivational Analysis Test (M.A.T.), are presented in relatively unfinished (mimeographed) and experimental form, and, second, even in the printed standardized tests, some factors are more validly and reliably measured than others. Known factor dimensions are included to increase research knowledge in the field though they do not reach routine, desirable reliability values.

While some of the batteries used at present—but not necessarily those evolving out from them in the next year or two—thus lack the usual, final trappings of a published test and are limited in the reliability and validity of certain factors, they are in a fundamental sense a great advance. No longer is the practitioner at the mercy of the subjective dilemma, namely, that "intelligence is defined only as that which an intelligence test measures and anxiety, what an anxiety scale measures." The multiplication of scales on this subjective basis, which can lead to as many diverse measures and definitions as there are psychologists, belongs to a past, relatively irresponsible age of psychology, which has already reaped its reward of research frustration and theoretical chaos. By contrast, he who utilizes the present Anxiety scale (43), knows, for example, that he is resting on a definition which is as applicable in Los Angeles as in Canberra or Stratford-on-Avon, and that an exact retest of criterion relationship can be carried out always by determination of this second-order factor in the community or clinic concerned or in other communities or clinics. This is important, for example, in comparing psychologically a sample of the population that enters a psychoanalytic institute for psychotherapy with a sample that enters an outpatient clinic of the Veterans Administration or the counseling service of a university.

Clinical validity for the above measures has also been demonstrated, but we have insisted that the required order, scientifically, is first to prove concept (factor) validity and second, cultural (clinical) validity, for it is theoretically useless to say that a measure predicts if we do not know what the measure is. Social and many other conditions can constantly change the relation of, say, anxiety to neurosis, and it is of great theoretical and practical interest to know how the various factors change their mode of interaction with different circumstances. Entrance into this higher realm of lawfulness is possible only if the original tests are demonstrably related to the factor concepts they are assumed to represent verbally.

Again, none of the above is meant to imply that all the tests to be described are in final, fully polished form. In fact, we wish to be explicit that the primary recommendation is for clinical research rather than routine practice (although some of the tests, as noted subsequently, are ready for routine practice as well as research). It must also be clearly understood that the term research as used here does *not* mean "ivory tower" types of investigation, devoid of immediate, practical utility. It includes, for example, the discovery of relations between meaningful, operationally defined personality traits and all sorts of criteria—such as school and occupational adjustment, response to therapy, placement in various syndrome categories, etc. Once adequately confirmed, these relationships become immediately applicable in clinical practice.

Proposed Clinician's Test Kit for Procedures Discussed

Hitherto, clinical diagnosticians, industrial psychologists, and educational psychometrists have tended to live in different temporary housing units, each with its own set of test gadgets, psychometric language, and values. Since it is the same human being in school, at work, and in the clinic, it is a defect of integration and formulation when the same conceptual entities in personality are not being measured. It has been one of the systematic aims of our approach to personality and motivation measurement (44) to show the applicability of the same personality and dynamic measures in all three areas of practice.

This movement is a logical consequence of advancing from test-centered testing to functional, trait-centered measurement. It does not deny that there will be differing relative emphases—on the pathological in the clinic, for example—but it claims that the total personality needs consideration in every applied psychological judgment and that, fundamentally, the understanding and measurement of this personality must be the same in school, industry, and clinic. There are several fields of application, but one psychological science. Response to this fact would pay off in (a) sheer economy of psychological service, in that the same test results and records would be available and useful across different guidance and clinical services, (b) more effective communication and common membership and standards among psychologists in these fields, and (c) scientific advance, in that criterion relations from different fields become mutually available.

The latter may be illustrated by the 16 Personality Factor (16 P.F.) Test, which is applicable equally to clinic, personnel department, and school and which has proved potent as a predictor in clinical diagnosis, occupational adjustment, and scholastic achievement. When the clinician has a 16 P.F. profile of his case, therefore, he has also a statistically proven predictor of the client's possibilities occupationally and scholastically (62, 122a) with which he can handle the total case far better than he could with a test used only within a clinic.

The main test kit of the clinician, for the types of examination described in Chapter 14, will therefore deliberately aim to maintain whatever overlap is reasonable and possible with the test kit of, say, the educational psychologist, although it will leave, for example, primary ability measures and the numerous achievement tests to the latter. The tests we believe essential to the clinician's kit are:

I. *General Purpose Tests and Test Batteries*	*Age Range*
A. Questionnaire Medium—General Personality	(Can be extended a year or so on each side, to overlap next age level test)
1. 16 Personality Factor (16 P.F.) Questionnaire, (62)	16, 17, and adults
2. High School Personality Factor (H.S.P.Q.) Questionnaire, (51)	12–16
3. Children's Personality Factor (C.P.Q.) Questionnaire, (176)	8–12
4. Early School Personality Factor (E.S.P.Q.) Questionnaire—in preparation	6–8
5. Pre-School Personality Factor (P.S.P.Q.) Questionnaire—in preparation	4–6
B. Objective Test Medium—General Personality	
The Objective-Analytic (O-A) Test Batteries for Adults and for Children 11–17 years of age (73)	11–17 years, and adults
C. Dynamic Measures	
The Motivational Analysis Test (M.A.T.) (74)	Adults

II. *Special Purpose Tests*
  A. Free and Conscious [1] Anxiety, U.I. 24, and F(Q)II
    1. Questionnaire, Adult, Trait (43)
    2. Questionnaire, Adult, State (43)
    3. Questionnaire, Child, Trait
    4. Objective Test, Adult, Trait (68)
    5. Objective Test, Adult, State (68)
    6. Objective Test, Child, Trait
    7. Combined Questionnaire and Objective Test, Adult, State Battery—with Eight Parallel Forms (for repeated administration, no matter how short the interval between testing occasions) (192a)
  B. Neuroticism
    1. Questionnaire, Trait, Adult (194)
    2. Objective Test, Trait, Adult
    3. Objective Test, State, Adult (neurotic malergies)

Not all of this kit is likely to be immediately available, as will be indicated under discussions of each test. The 16 P.F., H.S.P.Q., C.P.Q., and the Anxiety Scale are available with all needed handbooks, supplements, and norms. However, the O-A has no norms and younger Child and Pre-School O-A's are still in preparation.

Brief Description of General Purpose Test Batteries

At this point the clinician would probably desire just such information on the above tests as is normally given in test manuals. However, since space is short we shall give only a brief listing of the main features of the General Purpose Tests. Further information on them is available in Chapter 14 and in their ample manuals or handbooks (51, 62, 73, 74, 176). On the other hand, since the Special Purpose Tests are relatively new and, in some cases, do not yet have standardization or manuals, they will be presented at greater length, a section devoted to each.

We shall indicate clearly cases where such materials are not yet provided in final form, but in all cases fair estimates, at least, of reliability, validity, etc., can be given now, and they show that the batteries described are fully adequate for the experimental research work which we ardently hope they will encourage.[2]

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[1] Batteries for bound and unconscious anxiety were not included because of the difficulty of matching factors to these rather ill-defined clinical concepts. However, some tentative identifications with factors were made, and the interested investigator can find these factors listed in Chap. 5 and then measure them with single-factor batteries chosen from the Objective-Analytic Battery (73).

[2] Further information on the batteries described can be procured by writing to Laboratory of Personality Assessment and Group Behavior, University of Illinois, Urbana, Ill.

THE 16 PERSONALITY FACTOR QUESTIONNAIRE (16 P.F.) FOR ADULTS. This has three forms: A, B, and C. The first two (187 items each) require about fifty minutes, and the latter (105 items) is a special short form of thirty minutes. The 16 P.F. is administrable in group or individual situations, with answer sheet, preserving the test form for re-administration.

Scoring is by stencil key and takes about two minutes per form. The 16 P.F. yields:

1. Sten scores (10-point) on factors A, B (intelligence), C, E, F, G, H, I, L, M, N, O, Q_1, Q_2, Q_3, and Q_4. It has four standardizations: for general population adults, for college undergraduates, for men, and for women.
2. Scores on second-order factors of Introversion-Extraversion F(Q)I and Anxiety F(Q)II, and all other questionnaire neurotic-contributory factors discussed in this book (see Chap. 4).

Its Manual or Handbook and Supplement (62, 122a) contain also occupational and clinical profiles, regressions on various criteria, such as leadership and accident proneness, also decile standardization, equivalence and stability coefficients, sex differences, age corrections, and correlations among primary factors. French and Italian translations are published, and others are being prepared in German, Hindi, and Japanese.

THE HIGH SCHOOL PERSONALITY QUESTIONNAIRE, AGES 12 THROUGH 16 (H.S.P.Q.). There are two equivalent forms, A and B, each of 142 items, and they require forty minutes each for administration. They are administrable in group or individual situations, and answer sheets may be used to preserve forms for re-administration. Reading level is through eleven– or twelve-year-old level.

Scoring is by stencil key, about 1.5 minutes per form. It yields:

1. Sten scores (10-point) on fourteen factors: A, B (intelligence), C, D, E, F, G, H, I, J, O, Q_2, Q_3, and Q_4.
2. Sten scores on second-order factors of Introversion-Extraversion F(Q)I, Anxiety F(Q)II, etc., as in the 16 P.F., see above.

It has been standardized for High School Boys, for High School Girls, and for both together. The Handbook (51) contains profiles and regression coefficients, stability, consistency, equivalence, and concept or construct validity coefficients. Translated versions in Italian and other languages are pending.

THE CHILD PERSONALITY QUESTIONNAIRE (176) AGES 8 THROUGH 12 (C.P.Q.). There are two equivalent forms, A and B, of seventy items each, and administration requires 25–30 minutes. It is administrable in either group or individual situations and assumes normally that questions will be read by the child. Answering is done on the form itself.

Scoring is by stencil key, about 2.5 minutes per form. It yields:

1. Staves (5-point) scores on fourteen factors: A, B, C, D, E, F, G, H, I, J, N, O, Q_3, and Q_4.
2. Second-order factor scores on Anxiety, Introversion, etc.

It is standardized for primary school children, for boys, for girls, and for boys and girls together.

THE EARLY SCHOOL PERSONALITY QUESTIONNAIRE, AGES 6 THROUGH 8 (E.S.P.Q.)—IN PREPARATION. There are two equivalent forms, A and B. Each is expected to be of about eighty items and to require thirty-five minutes. It may be administered in either group or individual situations. Questions must be presented orally by the psychologist, although the child replies on a standard (pictorial) answer sheet.

Scoring is by stencil, expected to be about three minutes per form. It yields:

1. Staves (5-point) scores on thirteen factors.
2. Scores on second-order factors of Introversion, Anxiety, etc.

Standardization is for Primary School boys, for girls, and for boys and girls together. Coefficients, regressions, etc., are in the Handbook.

PRESCHOOL PERSONALITY QUESTIONNAIRE, AGES 4 THROUGH 6 (P.S.P.Q.)—IN PREPARATION. This exists at present only as an experimental form for 12 factors, with 72 items, requiring 50 minutes. It is for individual oral administration only. The psychologist records responses on an answer sheet.

Scoring is by stencil key, about two minutes per form. It yields:

1. Staves (5-point) on twelve factors.
2. Tentative second-order factors.

THE OBJECTIVE-ANALYTIC PERSONALITY FACTOR BATTERY (O-A), ADULT (17 YEARS UP) AND CHILDREN'S (AGES 11 THROUGH 17). The Adult and the Children's forms have the same basic structure and differ only in substitution of certain word-count tests in the latter.

For adults (17 years of age and older), there is an eighteen factor battery (U.I. 16 through U.I. 33), group or individual, and a twelve factor battery (U.I. 16 through 27), group or individual. For children (ages 11–17), there are two batteries, a ten factor (U.I. 16, 17, 19 through 23, 26, 28, and 29), and a fourteen factor (same as the ten factor battery, plus U.I. 18, 24, 25, and 30).

On a basis of six test-scores per factor, the battery can be given as a group test only; but if it can be administered individually, extra tests can be brought in to increase validity by using ten test-scores per factor. However, the Adult 12-factor Group-Battery employs only thirty-eight tests (but more scores) since it uses some tests to measure more than one factor. It is usually administered in five sessions of fifty minutes each. The Adult individual 12-factor Objective-Analytic Battery adds some eight individual tests and an additional fifty minutes of testing. The Adult group eighteen factor O-A adds only half an hour to the 12 O-A (forty-four tests in all), since secondary scores are derivable from the same tests. The Child 10-factor Group O-A employs thirty-five tests and usually requires five sessions of forty-five minutes each. The whole O-A battery is flexibly arranged so that various combinations for various factors can be taken out. In both Adult and Child batteries, a 6-test (group) or 10-test (group and individual) administrable battery can be made up for any single factor, requiring about twenty-five to forty minutes.

The administration of the Objective-Analytic Batteries requires various skills. The group tests use some slides, a loud-speaker, a stop watch, etc., while the individual tests use apparatus, mostly standard to psychological laboratories. The Battery supplies each test with (a) a statement of rationale of construction, (b) instructions for administration, (c) specimens of test and score sheet (of which mimeographed copies can be supplied) and (d) instructions for scoring. Scoring can be done clerically, with a key, the tests being objective.

The Handbook for the O-A Batteries (73) contains data on interpretation and use of factor scores, a bibliography of its use, but no standardization, since it is anticipated that ongoing research will be incorporated in the final revision. However, surveys with the O-A on military, student, mental hospital, and prison populations have been made. See Table 5–1 and, especially, Diagram 15–1, p. 463, for data on the discriminatory power of the full O-A for neurotics *vs.* normals.

It should be noted, also, that Objective-Analytic Batteries are in preparation for ages under 10.

The MOTIVATIONAL-ANALYSIS TEST (M.A.T.). As stated in Chapter 14, this battery aims to measure ten dynamic factors as follows:

Ergic Tension on Ergs:

Sex
Self-Assertion
Fear
Narcism
Hostility, Sadism

Sentiment Strength on:

Self (concept)
Superego
Career
Wife or Sweetheart
Parental Home

It does so through measuring twenty-eight attitudes, two of which are markers for each factor, except for the self and superego sentiments which are represented by a larger number of markers.

Each attitude is measured as the total of four kinds of objective test —autism, information, work association, and utilities—shown to have highest validity on, and used to contribute to scores upon, two components, namely, Integrated and Unintegrated interest. Items have been arranged with maximum convenience for scoring by key.

Testing time required is thirty-five to fifty minutes (depending on reading speed of subjects), approximately ten minutes for each of the four sub-tests, which have approximately fifty items each. The test can be administered in a group or individual situation, and the only apparatus required is a metronome or similar device for announcing four-second intervals for the word-association test.

Scoring is by stencil and can be done clerically (since only selective answers are involved), requiring about five minutes per test form.

The handbook (74) gives reliabilities and validities as well as the matrix of the original factor-structure, the correlations among factors, and the basis of norm tables in the form of means and sigmas on various groups.

Special Purpose Tests

As described previously (see discussion, pp. 395 f.), a special purpose test is one which aims to measure only one factor, such as Anxiety F(Q)II, or one relatively restricted set of factors corresponding to a clinical concept, for example, the neuroticism-contributing factors. This contrasts with general purpose batteries such as the Sixteen Personality Factor Test (16 P.F.), the Objective-Analytic Personality Test (O-A), or the Motivational-Analysis Test (M.A.T.) (62, 73, 74) which aim at comprehensive coverage of the general personality or dynamic area. Chapter 14 (pp. 399 ff.) suggests the appropriate function and use for each type of battery in clinical research and practice. The special purpose batteries to be discussed here have been listed on page 434. For each battery as a whole, information is provided, where available and appropriate, on (a) reliability, (b) concept or construct validity (correlation with factor), (c) clinical criterion validity (relation to what is common to clinical judgments), (d) administration procedures, (e) administration time, (f) scoring procedures, and (g) norms. Also, (h) specimen items are provided for the tests, as well as the sources from which complete copies may be procured. Finally, (i) relationships to other frequently employed and standard test instruments are given, where available.

As for norms, listed above, questionnaire trait measurements of Anxiety and neuroticism which choose exactly those items now in the 16 P.F. have as their norms the usual 5.5 sten value for normals; and for neurotics and highly anxious persons they have the sten values reported here in Tables 4–2, 6–1, and 7–1. The special purpose Anxiety and neuroticism questionnaire tests have the usual norms available in their manuals or handbooks (43, 194). Otherwise, users of these batteries must usually develop norms from relationships between the persons they test and similar pooled information increasingly available in the laboratory.

MEASUREMENT OF FREE AND CONSCIOUS ANXIETY, F(Q)II AND U.I. 24. As indicated by loadings on psychiatric evaluations of anxiety, this factor, in both its questionnaire and objective test forms, far exceeds all others in its claim to correspond to the core of psychiatric judgments as to the nature of anxiety. In over twenty studies comprising over 1,200 test administrations, the reality (stability) of the pattern was thoroughly established, through various types of persons and in questionnaire and objective as well as rating measurements. The factor involves free-floating anxiety, guilt, inferiority feelings or lack of self-assurance, low ego strength, etc. (Chaps. 4, 5). It is measurable by either questionnaire or objective tests, as a trait or as a state.

As discussed more fully in Chapter 14, the Anxiety batteries to be presented will be useful for precise measurement in any case where the practitioner may wish to assess what is common to psychiatric evaluations of anxiety; for example, in selection for combat or other dangerous jobs, for general diagnostic-prognostic clinical assessments, and as a means of evaluating the effects of various standard or experimental therapies, etc. The factor is known to conform to what is common to psychiatric evaluations of anxiety; it is one of several factors discriminating between clinically judged neurotics and normals; and it shows changes in the lowered Anxiety direction from pre– to post-therapy testing. Finally, it is sensitive to some, but not all, stress stimuli (Chap. 11). The tests chosen for the several questionnaire and objective test trait and state batteries are those which have loaded U.I. 24 Anxiety most highly and consistently through studies employing different types of people.

QUESTIONNAIRE MEASUREMENT OF ANXIETY AS A TRAIT IN ADULTS. Factor sub-tests 1 through 5 in Table 15–1 have already been formed into a properly weighted battery, which is published as the IPAT Anxiety Scale. The handbook for this test (43) gives particulars on reliability, validity, norms, etc. While test reliability and validity are very satisfactory now (see Table 15–1), an even higher validity and reliability can be achieved by increasing the number of items used to measure each sub-test factor and by adding H— and M+ items from the 16 P.F. This also increases the reliability of each factor sub-test to the limits cited in the 16 P.F. Handbook (62), thereby enabling reliable separate evaluation (using full 16 P.F. norms) of the

TABLE 15–1

Questionnaire Measurement of Anxiety as a Trait in Adults: F(Q)II

		Sub-test, 16 P.F. Primary Factor in High Anxiety Direction	Validity: Average Correlation with U.I. 24 Anxiety Factor*	Number of Studies	Number of Reversals	Approxi-mate Weightings
1	Q_4+	More Ergic Tension	+.67	8	0	7
2.	O+	More Guilt Proneness	+60	8	0	6
3.	Q_3-	Less Will Control	–53	6	0	5
4.	C–	More Emotionality	–49	8	0	5
5.	L+	More Protension or Suspiciousness	+45	6	0	4
6.	H–	More Threctic or Less Venturesome	–32	7	0	3
7.	M+	More Autia or Dissociative Non-Conformity	+30	8	0	3

BATTERY AS A WHOLE

Reliability (Split-Half):	.90
Construct or Concept Validity (Correlation with Anxiety Factor):	.85
Clinical Criterion Validity as Correlation with Psychiatric Evaluations of Overall and Free Anxiety: (Relationships to Classical Clinical Syndrome Categories are in Chapter 7)	.40

Administration and Scoring: Virtually self-administering in group or individual form, key-scored, requiring about ten minutes for disturbed persons. Henceforth in this chapter, time estimates are given for highly anxious or neurotic persons and can be expected to be 10–20 per cent shorter for normal or moderately disturbed persons.

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*See Tables 4-3 and 4-5. A ninth confirmation of the pattern exists, through the work of Warburton in England (see Warburton, Appendix I). The data were received too recently for combination with previous results (Table 4-5), but the obtained factor loadings were:

distinct sub-test components contributing to overall level of U.I. 24 Anxiety (Ergic Tension, Guilt, Suspicion, Ego Strength, etc.). In its published form (43), only the total Anxiety score (based on forty items) and Covert and Overt Anxiety indices (twenty items each) are based on a sufficient number of items for adequate reliability in routine practice. Anxiety-component scores on factors Q_4, O, L, Q_3-, and C— can be used experimentally and for research purposes, however; and, if the number of items per factor is increased by appropriating additional 16 P.F. items, as described above, these components become reliable enough for routine practice. No matter what the size of the battery, weightings assigned to separate sub-tests in computing total Anxiety-level must follow as closely as possible the relative average loading of the factor sub-tests in Table 15–1.

The test, given either individually or in groups, is untimed, but typically requires only about five to ten minutes administration time in its 40-item published form. The items are at a moderately low reading level and are generally non-stressful. It has been shown that they can be understood by educational levels as low as Grades 5 or 6 completed and that both neurotics and psychotics in remission can handle the test.

Some specimen items are given below, with the high Anxiety alternative underlined.

1. If I had my life to live over again I would
   (a) Plan very differently
   (b) In-Between
   (c) Want it the same
2. In discussion with some people, I get so annoyed that I can hardly trust myself to speak
   (a) Sometimes
   (b) Rarely
   (c) Never
3. I make a point of not being absent-minded or forgetful of details
   (a) Yes
   (b) Uncertain
   (c) No
4. Most people are a little queer mentally though they do not like to admit it
   (a) True
   (b) Uncertain
   (c) False
5. As a child I was afraid of the dark
   (a) Often
   (b) Sometimes
   (c) Never

The published test (43) is scored by stencil key on the test booklet itself, requiring about one minute of clerical scoring time per test. The handbook gives norms for conversion of total raw score to total Anxiety level in either stens or deciles, separately for men and for women in the general population (N = 795; 482 men and 313 women). In addition, Bendig (16) has recently contributed percentile and stanine norms for 882 college undergraduates (475 men and 407 women). The test handbook gives age corrections and extensive background for psychological interpretation of test scores, including clinical and occupational criterion data.

Once sten values have been obtained, they can be used to relate the patient to defined general populations and also to eight or nine classical clinical syndrome categories (see Chap. 7, especially Table 7–1 and discussion pp. 134 f.).

It is useful to know the relationships between the IPAT Adult Anxiety Scale and other standard test instruments, in order to avoid duplication of measurement and to facilitate interlocking of results and records, where other highly correlated measurements have already been used. These relationships are summarized below.

1. *The Taylor Manifest Anxiety Scale* (212) correlates about +.80 with our Anxiety questionnaire factor scale (values of +.82 and +.85 in Table 4–6, and +.75 in Bendig's research [16]). This value is about as high as the reliability of each scale and it could be argued that the two tests are measuring essentially the same phenomena, as indeed may be the case for collating research data on Anxiety as a trait. In so far as the Taylor Scale is accepted as a measure of F(Q)II Anxiety, the work of Kerrick (131), Windle (226), Bendig (14), and Goodstein (104), relating it to other well-known questionnaire, achievement, and ability measures, is valuable in adding to our store of knowledge about Anxiety's associations. In general, however, we have preferred the IPAT Adult Anxiety Scale over the Taylor Scale for general use because (i) the IPAT Anxiety Scale's relationships are known for state fluctuations as well as for personality trait analysis (Chap. 9), and, (ii) it has distinct, analyzable components about which a background of information has been built up over the years, whereas the Taylor Scale has only recently been analyzed into components (15, 169), about which little is as yet known.
2. Bendig (16) reports that the MMPI Lie Scale correlates −.50 with the IPAT Anxiety Scale, N = 200. Karson and Pool (126) correlated each of the 16 P.F. factors with each of the MMPI scales. Their data show that the Anxiety-component factors (Table 15–1) have consistent and very high correlations with MMPI scales P_t, S_c, K, H_s, and F. All correlations are positive between Anxiety, F(Q)II, and the MMPI scales, except K, which is negative in direction. Correlation of *individual* Anxiety components run as high as +.75 or +.77 with the individual MMPI scales and average well

above +.50 for all five main components. We conclude that, at least for the P_t, S_c, and K scales, the multiple correlation with the Table 15–1 Anxiety Scale is a minimum of +.80 or +.85. The reason that correlations can be so high between Anxiety and several different MMPI scales is, as Karson and Pool note (126), because the MMPI scales are themselves highly intercorrelated (in a predominently anxious and neurotic area of personality). Thus Karson and Pool found a value of +.89 between P_t and S_c.

3. For correlations with other test instruments besides the Taylor Scale and the MMPI, we are indebted to the work of A. W. Bendig (16). With N's ranging from 200 to 238, he reports the following relationships between other tests and the IPAT Anxiety-Scale (high Anxiety direction): Eysenck Neuroticism Scale (88) = +.77; Eysenck Extraversion Scale (88) = −.29; Edward's Social Desirability Scale (84) = −.71; the Winne Neuroticism Scale (227) minus eight items it shares with the Taylor Scale, (212) = +.59; and Adorno *et al.*'s Authoritarianism Scale (2) = +.06 and +.16 with each of two halves of the IPAT Anxiety Scale. Davies (79, and Table 4–6), factor analyzed a wide selection of Rorschach indices with the 16 P.F. and found appreciable correlations, in the high Anxiety or F(Q)II+ direction, with inanimate movement (+.44) and animal movement (+.39). Of course, quite different correlations might be found, depending on who is using the Rorschach and how it is used. Warburton (see Appendix I), ascertained the loadings on F(Q)II Anxiety of the scores from the Kuder Preference Record (134) and the Allport-Vernon Scale (4, 218). Of these, only the Kuder Preference Record Computational Interests score loaded, and this loading was low (−.29).

QUESTIONNAIRE MEASUREMENT OF ANXIETY AS A STATE IN ADULTS. The Anxiety state battery (Table 15–2) differs from the trait battery only in the presence of Q_2+ and the absence of L+ and H− (which load in the expected direction but too low to be of practical measurement use). Thus, the IPAT Anxiety-Scale (43; and previous section here) will be useful for Anxiety state measurement with appropriately modified weightings of factor components, but the preferable battery for more precise delineation of the state, with slightly different accenting of components, will select items from the 16 P.F. and weight factors according to Table 15–2 above. If the IPAT Anxiety Scale is used, the norms will be as described in the previous section (N = 795 general population men and women, plus 882 college undergraduates). Otherwise, the user can employ the full 16 P.F. norms (62), by (a) choosing the full complement of 16 P.F. items (from either form A, B, or C of the 16 P.F.) for each of the factors in Table 15–2 (the proper items being identified on pp. 23–24 of the 16 P.F. Handbook supple-

TABLE 15–2

QUESTIONNAIRE MEASUREMENT OF ANXIETY AS A STATE IN ADULTS

Sub-test, 16 P.F. Primary Factor in High Anxiety Direction	Validity: Average Correlation with U.I.24 Anxiety Factor	Number of Studies	Number of Reversals	Approximate Weightings
1. C−, More Emotionality	−53	2	0	5
2. Q_3−, Less Will Control	−51	1	0	4
3. Q_4+, More Ergic Tension	+44	2	0	4
4. O+, More Guilt Proneness	+20	2	0	2
5. Q_2+, More Self-Sufficiency	+30	1	0	1
6. M+, More Autia or Dissociative Non-Conformity	+18	2	0	1

BATTERY AS A WHOLE

Reliability (Split-Half): .65-.70

Construct Validity (Correlation with Anxiety Factor): .65-.75

Administration and Scoring: Virtually self-administering in both group or individual form, requires about ten minutes, and is key-scored.

ment), then (b) entering raw scores in the 16 P.F. norm tables to get stens for each Anxiety-component factor and, finally, (c) if a total Anxiety score is desired, by weighting the sten deviations from 5.5, sign considered, according to the Table 15–2 weights for each factor, to get a mean deviation for all factors which, when applied to 5.5, gives the state sten Anxiety value.

As for the two alternative procedures described above, it should be noted that the former is far easier and is adequate for total Anxiety score, but the latter is preferable if the user wishes to evaluate each Anxiety state component separately and with adequate reliability. It must also be mentioned that both methods actually provide only trait norms and that, eventually, special procedures will have to be developed to make norms more specifically appropriate to state concepts. At present, they compare the person, on each occasion of measurement, with a standardization sample at only one occasion of measurement. Presumably, for one thing, norms should be developed to compare also the person's change over occasions of measurement with change over the same span in a standardization sample. While it must be frankly

TABLE 15–3

QUESTIONNAIRE MEASUREMENT OF TRAIT ANXIETY IN CHILDREN
(Ages 11 or 12 to 17 or 18)

Sub-test, 16 P.F. Primary Factor in High Anxiety Direction	Validity: Average Correlation with U.I. 24 Anxiety Factor	Number of Studies	Number of Reversals	Approximate Weightings
1. H−, More Threctic (Less Venturesome)	−57	2	0	6
2. O+, More Guilt Proneness	+50	2	0	5
3. Q_4+, More Ergic Tension	+44	2	0	4
4. D+, More Excitability	+43	2	0	4
5. C−, More Emotionality	−40	2	0	4
6. Q_3−, Lack of Will Control	−33	2	0	3

BATTERY AS A WHOLE

Reliability (Split-Half): .70-.75

Construct Validity: .70-.75

Administration and Scoring: Virtually self-administering in group or individual test form, requiring about ten minutes, and is key-scored.

admitted that we have not yet solved this important problem, we nevertheless know of no other tests which do so at present.

Background discussion on the distinction between trait and state and problems relating thereto can be found in Chapter 9 and another reference (44).

QUESTIONNAIRE MEASUREMENT OF ANXIETY AS A TRAIT IN CHILDREN. The children's Anxiety pattern is similar to the adult trait pattern (see Table 15–1) except for the omission of Protension (L+) and Autia (M+), the inclusion of Excitability (D+) (which appears only in children's questionnaire factorizations), and the relative salience of Threctia (H−). Note that items to suit this age range are drawn from the H.S.P.Q. (51) a children's and young adult (11 or 12 to 17 or 18 years of age) version of the 16 P.F. (62), with weighted factor contributions following Table 15–3. H.S.P.Q. norms can be used if all items for each of the H.S.P.Q. questionnaire factors are utilized, entered in the appropriate norm tables, and weighted according to Table 15–3, following procedures outlined on pages 443 f. of this chapter. It

TABLE 15-4

Objective Test Battery for Measuring Anxiety as a Trait in Adults

Test No.	M.I. No.	Title of Variable in High Anxiety Direction	Validity: Average Correlation with U.I. 24 Anxiety Factor Group-Administered Tests	Number of Studies	Number of Reversals	Approximate Weightings
1.	219	More Willingness to Admit Common Faults	38	7	0	3
2.	211	More Susceptibility to Annoyance	36	6	0	3
3.	481	More Susceptibility to Embarrassment	34	3	0	3
4.	473	Fewer Friends Recalled	28	2	0	2
5.	108	More Modesty in Estimating Skill in Untried Performance	24	6	0	2
			Individually-Administered Tests			
6.	77	High pH Saliva (Alkaline)	10	3	0	1
7.	620 621 622 623	Increase and/or Recovery of Pulse Rate to Shot and/or Cold Pressor Stimulus	60	4 variables in 1 study	0	1

BATTERY AS A WHOLE

Reliability (Split-Half): .85

Construct Validity: .80-.85

Clinical Criterion Validity: .25 to .40

Administration and Scoring: Tests are easy to administer, in group or individual form, key-scored, requiring about 30-35 minutes. Tests 6 and 7 require special administration, scoring skills and apparatus. They can be administered individually only, requiring about five minutes total administration time. They are, however, valuable for research purposes in that they are almost should also be noted that for children there has not yet been a direct check of the factor pattern against clinical evaluations of Anxiety. The assumption that the children's pattern is clinically valid in this sense, stems from its similarity to the adult pattern, which is known to be clinically valid.

The reliability, validity, administration, and scoring figures in Table 15–3 are estimates only, predicated on a 50-item battery covering the Anxiety-related factors in Table 15–3. However, the test itself is not published as yet in a separate form and must be assembled from the H.S.P.Q., as noted above. It is recommended for clinical research on the Anxiety trait in children, including an establishment of criterion relations, but should be used only with caution and with appropriate reservations in routine practice.

OBJECTIVE TEST MEASUREMENT OF U.I. 24, ANXIETY. Questionnaire measurement has the advantage of ease and speed of administration and immediate meaningfulness of interpretation, but it is always possible that the patient's capacity or motivation for self-insight will be impaired and, therefore, his questionnaire self-rating assessment distorted. This means that, wherever possible, an objective test (disguised in purpose, with answers difficult to fake) as well as a questionnaire test battery should be administered. In special cases of the type just described, the objective tests should be emphasized in assessment of U.I. 24 Anxiety level.

OBJECTIVE TEST MEASUREMENT OF ANXIETY AS A TRAIT IN ADULTS. Table 15–4 agrees in form with the previous tables in this chapter, except that the Master Index number, used to catalogue and identify all objective tests in this laboratory, is given for each test.

In general the construct or concept validity (correlation with Anxiety factor) of objective test batteries runs somewhat lower than for similar purpose questionnaire measurement, because the objective are relatively new types of tests, only recently emerged from the experimental stage. However, the loadings of the adult trait objective test battery are quite substantial and, as a look at Table 5–4 will confirm, the tests have tended to improve in loading in the course of continuing research, through lengthening and item analysis, so that the Table 15–4 overall average appreciably underestimates the present construct validity of each test. Earlier forms of this test battery, as a whole, without the improvements of the most recent four or five studies, had already achieved a construct validity of between +.70 and +.75 (63), and a conservative estimate of the present test battery's validity is +.80. The clinical criterion validity is the averaged correlation between the factor score and the consensus of clinical judgments of anxiety level. As described in Chapter 5, this (and its questionnaire expression) is the only factor which correlates significantly and consistently (through different persons evaluated and different psychiatrists' evaluations of Anxiety). The low value here is for the most part due to disagreement between clinicians as to what they mean by Anxiety, and to the resulting fact that each individual clinical evaluation tends to load on several distinct personality dimensions (64), differing between psychiatrists. In other words, we believe that the clinical criterion value here, while low, approaches an upper limit set by the nature of the clinical rating process itself.

Split-half reliabilities were computed for the group tests, corrected by the Spearman-Brown prophecy formula and computed in each of two studies, R4 (63) and R5, (Appendix I), with N's of 187 and 94 respectively. These reliabilities are as follows: M.I. 219 = +.77, +.80; M.I. 211 = +.89, +.86; M.I. 481 = +.90, +.90; and M.I. 108 = +73, +83. The split-half reliability of a slightly longer version of the present battery is +.85. The relationships of this test battery to other standard tests will follow those of its questionnaire counterpart, F(Q)II approximately, but in attenuated form (see pp. 442–43). Table 5–4 includes the significant relationships found among variables checked, while American Documentation Institute Document #5336 details the tests having non-significant correlations with U.I. 24.[3]

Group test administration is relatively simple. The administrator reads aloud a brief, easy-to-understand set of instructions, while the subject reads them to himself. The administrator then answers any questions and allows the subject to begin the tests. After instructions, approximately 90 per cent of normal subjects will finish the tests as follows: M.I. 219 = 4.5 minutes, M.I. 211 = 7.5 minutes, M.I. 481 = 6 minutes, M.I. 473 = 1.5 minutes, and M.I. 108 = 7 minutes. The entire group test battery thus requires about thirty to thirty-five minutes to administer. But if disturbed or low intelligence subjects are being tested and/or the administrator wishes to have all subjects finish tests, time limits can be extended, except for M.I. 473 which has a standard one and one-half minute time-limit.

Some specimen items from this U.I. 24 Adult Trait Objective test battery (Table 15–4) follow.[4]

M.I. 219, Willingness to admit common faults. The patient is asked to answer honestly forty-three items, such as the following, which describe faults that everyone, or almost everyone actually has. Score in the high Anxiety (guilt) direction is the number of faults the subject admits. Half the items admit faults through a "yes" answer, half by "no," in order to control the tendency-to-agree variable.

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[3] This document may be ordered from the American Documentation Institute, Photoduplication Service, Library of Congress, Washington 25, D.C.

[4] No all-or-none distinction is possible between objective tests and questionnaires. Rather, as discussed elsewhere in more detail (48, 189), there are degrees of objectivity, with some tests, more than others, having effective disguise of purpose and/or unfakeability. The objective tests described subsequently in this chap. are actually more objective than typical questionnaires (in the above sense of disguise of purpose and unfakeability), but it is certainly not claimed that they are completely objective.

	Yes	No
1. I have always played absolutely fair in games	___	___
2. I often do not try as hard as I should to do the right thing	___	___

M.I. 211, Susceptibility to annoyance. The subject checks each of ninety-three items, covering a wide range of types of irritations, as indicated by the specimen items below. Scoring in the high Anxiety direction is two points for each item marked "Very Annoying," one point for each marked "Somewhat Annoying," and 0 points for items marked "Not Annoying."

	Very Annoying	Somewhat Annoying	Not Annoying
Bumpy Roads	___	___	___
Crying Children	___	___	___
Dirty or Obscene Jokes	___	___	___
People who Talk with Food in their Mouths	___	___	___

M.I. 481, Susceptibility to embarrassment. This is a 65-item checklist of the same type as M.I. 211, with "Not Embarrassing," "Somewhat Embarrassing," and "Very Embarrassing" offered as the alternatives, yielding scores of 0, 1, and 2, respectively, for each item in the high embarrassment-high Anxiety direction. Sample items are: "Being thrown out of a public place," "Using a washroom without adequate soundproofing," "Being laughed at by friends," "Leaving a small tip when short of money," etc.

M.I. 473, Fewer friends recalled. The instructions first define "friends" as "people you want to continue to know for a long time," "people you trust and who trust you," and "people with whom you have a mutual affection and depth of understanding." The subject or patient is then given one and one-half minutes to write down the first and last names of his good friends. They may be male or female, and relatives are acceptable if they also qualify as friends. Score is the reciprocal of the number of friends written down in one and one-half minutes; that is, the score is fewness of friends, adding in directly to higher U.I. 24 Anxiety.

M.I. 108, More modesty in estimating skill in untried performance. The subject is queried about a wide range of different common activities and skills, in a two-part item form. In the first part of the item he chooses from among four alternatives the one which most accurately describes his amount of experience in the activity described; and in the second part, one of four alternatives, describing his anticipated self-estimated level of performance in the activity. Score is based only on those items for which, in the first part, he marks one of the two lower levels of experience. Then, for such items the modesty score is computed on the second part, by assigning a score of four for the lowest self-estimate of capability in the activity, three for the next lowest, etc. This modesty score, averaged over all scoreable items, adds in positively to the total U.I. 24 Anxiety score.

Individual tests. As noted previously, a valid estimate of U.I. 24 Anxiety can be obtained from group tests only, but validity can be increased, and extra objectivity achieved by using the two non-verbal, individually administered Tests 6 and 7 listed in Table 15–4. M.I. 77 is administered and computed in a manner which is relatively standard among physiologists, but special care must be taken to administer M.I. 620–623 precisely in the manner described below, since similar-appearing measures, administered somewhat differently, have failed to load U.I. 24 Anxiety.

M.I. 620–623, Increase and/or recovery of pulse rate to shot and/or cold pressor stimulus. See also Golding's work (G in Appendix I). In the cold pressor (increase) measure, patients lie down on a bed and rest for about five minutes or until pulse rate becomes as low as possible. Three leads of an electrocardiogram are used to get a graphic recording of the pulse rate. A 60-second recording of the resting pulse rate is made first. The subject then immerses his hand in a dish of iced water. At this time the ECG tape is marked. He keeps his hand in the water for thirty seconds, then removes his hand gently from the water and lays it on a bed or soft surface next to him. At this time the ECG tape is again marked and the pulse is again recorded for about ninety seconds (once each ten-second interval).

The increase is determined by taking the difference between resting (pre-stress) pulse rate and the product of six times the highest recorded post-stress pulse rate (one of nine ten-second intervals). The recovery is figured by counting the lapse in time between the stimulus and the return of the pulse to normal.

The same procedure is used for the shot stimulus increase and recovery measurement, with the firing of a .22 blank starting gun being substituted for the iced water as stimulus. The shot stimulus is a surprise; the subjects are not aware that any stimulus will be given.

With the absence of replication evidence at present, M.I. 620–623 is a more provisional measure than any of the others reported in Table 15–4; however, the size of the relationship found suggests that strict adherence to the above instructions will confirm the relationship.

As Chapter 10 indicated, we are on the brink of discovering many more physiological and somatic associations of Anxiety, and in the very near future these should be confirmed well enough for routine diagnostic use. See, for example, high hippuric acid excretion, poor performance on motor coordination and strength tests, little (per cent) rise in capillary resistance to shot startle in Table 10–7. We are inclined to believe that the future of objective test measurement lies in this direction, for such physiological measures are certainly less fakeable than verbal objective type tests.

A slightly less advanced version of the Table 15–4, adult objective Anxiety trait battery is available as a single factor battery in the 1955 O-A Battery (73). A more intensified version of the U.I. 24 adult Anxiety trait battery, virtually identical to the battery described above, has recently been published (68), and a supplement giving the usual test norms is expected to be published soon.

OBJECTIVE TEST MEASUREMENT OF ANXIETY AS A STATE IN ADULTS. Table 15–5 follows the form of Table 15–4, in presenting the U.I. 24 state Anxiety battery for adults. All the tests here are also U.I. 24 trait markers, except for individually administered tests, M.I. numbers 77, 443, 444, and 617. Number 617 has not yet been checked against the trait. Administration and scoring of M.I. Numbers 219, 108, and 211 are as described in the Table 15–4 discussion, while 77, 443, and 444 are too well known to require further discussion. M.I. 617, the plasma 17-OH measurement, which is relatively complex, requiring considerable technical skill, is described elsewhere (166). The physiological, individually administered tests are generally less convenient to administer and score but have the advantages that they are (a) harder to fake, and (b) can be repeated over relatively shorter test-retest intervals than can the verbal group tests. In Table 10–4, there are other suggestions for physiological state measurement of Anxiety.

The new test battery for objective measurement of Anxiety (68), cited above as a trait measure, also contains tests and instructions for use as a state Anxiety measure. However, as is the case with state questionnaire measurement, state objective test measurement is a very new field and the present battery is recommended primarily for clinical research (establishing criterion relations, etc.).

OBJECTIVE TEST MEASUREMENT OF U.I. 24 ANXIETY AS A TRAIT IN THE CHILD, 11–17. The prognostic and preventive importance of measuring anxiety in the child is too apparent to require emphasis here. Table 15–6 presents the proposed battery, a less recent version of which can be obtained as a single factor battery in the O-A (see 73, U.I. 24, Child). The tests are similar to those employed in the adult trait and

TABLE 15–5

Objective Test Battery for Measuring Anxiety as a State in Adults

M.I. No.	Title of Variable in High Anxiety Direction	Validity: Average Correlation with U.I. 24 Anxiety Factor	Number of Studies	Number of Reversals	Approximate Weightings
		Group-Administered Tests			
219	More Willingness to Admit Common Faults	35	2	0	3
108	More Modesty in Estimating Skill in Untried Performance	29	2	0	3
211	More Susceptible to Annoyance	46	1	0	3
		Individually-Administered Tests			
444	Higher Systolic Pulse Pressure	36	3	0	3
617	More Plasma 17-OH in Serum	27	2	0	2
443	Low Absolute Level of Galvanic Skin Resistance	26	2	0	1
77	High Acid pH Saliva (alkaline)	23	2	0	1

BATTERY AS A WHOLE

Reliability (Split-Half): .70-.75

Construct Validity: .65-.70

Administration and Scoring: Group tests require only about fifteen minutes and are key-scored. Total battery requires 30-40 minutes.

state U.I. 24 batteries (see Tables 15–4 and 15–5). However, where necessary, the wording and content of items have been specially adapted to younger ages. Child objective test measurement is a frontier in psychometrics and the three child objective test studies thus far completed attempted to cover as wide a range of variables as possible; hence, only three variables were well enough replicated for standard factor measurement. Therefore, this child's battery must be considered more experimental than the others presented so far. It is suggested, whenever possible, that it be used in conjunction with the child questionnaire Anxiety battery (see Table 15–3), to increase opportunities for acceptably valid and reliable estimates of U.I. 24 Anxiety.

TABLE 15-6

OBJECTIVE TEST BATTERY FOR MEASURING ANXIETY AS A TRAIT IN THE CHILD, 11-17 YEARS

M.I. No.	Title of Variable in High Anxiety Direction	Validity: Average Correlation with U.I. 24 Anxiety Factor Group-Administered Tests	Number of Studies	Number of Reversals	Approximate Weightings
211	More Susceptible to Annoyance	46	3	0	4
219	More Willingness to Admit Common Faults	22	3	0	3
108	More Modesty in Estimating Skill in Untried Performance	16	2	0	2

BATTERY AS A WHOLE

Reliability: .60-.65

Construct Validity: .55-.60

Administration and Scoring: Group or individual administration, requiring about 15 minutes, and key-scored.

PARALLEL-FORMS FOR U.I. 24 STATE MEASUREMENT—AN EIGHT-FORM BATTERY. Once trait and state Anxiety batteries were established in single battery form, it was possible to turn our attention to the development of parallel forms for experimental and practical problems which require assessment of Anxiety level on many closely spaced and successive occasions for the same set of persons. Examples of such problems are: (a) the evaluation of the effects on Anxiety level at successive points in time or (b) the comparison of the Anxiety levels of a group of persons when treated experimentally in a variety of ways. The state questionnaire battery and the group objective test state measurements (Tables 15–2 and 15–5) are suitable for this purpose, if sufficient time intervenes between testing occasions. Otherwise, recall of the verbal items from a previous occasion may speciously affect response to the same items on a subsequent occasion. That is, the usefulness of such items becomes gravely suspect, when it is necessary to assess a given person's Anxiety level several times in a week or even a day. For such rapidly repeated state measurements, we must employ either (a) physiological measurements of the type in Table 15–5, or (b) verbally mediated objective test items which differ from form to form (thus removing artificial recall effects).

Heretofore, the difficulty in constructing such parallel forms has been the dearth of verbal items in the total Anxiety-related pool. However, as a result of test development and item analysis over the twenty or more researches described in this monograph, we collected a pool of well over five hundred questionnaire and objective test items with known and substantial U.I. 24 validity. From the best of these, it therefore became possible to construct eight 50-item parallel forms, each form repeating no more than two or three items present in any other form. Each form of the test (A through H) consists of items selected from each of the following types of tests: (a) Questionnaire Items from Anxiety-Component Factors, Q_4+, Q_3-, O+, C−, L+, H−, and M+ (see Tables 4-3 and 4-5); (b) an Anxiety-Tension Symptom Checklist; (c) Susceptibility to Annoyance, M.I. 211; (d) Willingness to Admit Common Faults, M.I. 219; (e) Tendency to Agree, M.I. 152; (f) Modesty in Estimating Skill in Untried Performance, M.I. 108; and (g) Susceptibility to Embarrassment, M.I. 481. All of these tests have previously been described in this chapter except the questionnaire-type anxiety symptom checklist to be fully described and analyzed elsewhere (194b), which is a 90-item, self-checklist covering the realm of clinically judged symptoms of anxiety or tension, and (b) "tendency to agree," which is simply the proportion of "yes" or "agree" responses to the total on the questionnaire items and on "willingness to admit common faults." These latter two tests are balanced so that the total "yes" and "no" responses contribute with equal probability to high score on them; hence, "tendency to agree" can be taken as a distinct score. The battery as constituted above can be administered in either group or individual form requiring about ten minutes per form. It is objectively scored.

The eight parallel-form Anxiety state battery was developed for the MR study (Appendix I). The Anxiety factor found in this study confirmed the loading of each test form on the U.I. 24 state factor, and a separate standardization study on an N of 94 college undergraduates (see Appendix I, R5) yielded the validity and reliability information detailed in Table 15–7.

The average factor or construct validity for all eight forms is +.56, while the average inter-form reliability is +.51. If only the better five forms, B, C, D, F, and G, are used, both validity and reliability become approximately .60. The construct (or concept) validity of each form can be enhanced by adding several physiological tests known to have substantial loadings on the state Anxiety factor (see Tables 10–1, 10–4, and 15–5). With such tests, of course, there is no problem of practice or memory effects on identical items repeated over time. Reliability is expected to be improved by item analyses now in progress. It is felt

TABLE 15–7

Factor Validity and Inter-Form Reliability for each Form of the Eight-Parallel-Form U.I. 24 Anxiety Battery

Form	Construct Validity: Correlation with U.I. 24 Factor	Inter-Form Reliability: Average Correlation with Other Seven Forms
A	+.56	+.46
B	+.54	+.53
C	+.53	+.53
D	+.64	+.50
E	+.51	+.53
F	+.68	+.57
G	+.53	+.51
H	+.50	+.41

that the achievement of this eight-form Anxiety battery will be a significant contribution to research progress, even though reliability and validity are not now as high as could be wished. The battery has recently been published with handbook and test copies (192a), and norms are now being gathered.

Measurement of Clinically Judged Neuroticism

Free Anxiety can be measured as a single functionally unitary trait, an entity whose components can be shown statistically to vary together. But the difference between clinically judged neuroticism and normalcy is accounted for by many distinct traits or factors (the multi-factor theory of neurosis). The significance of this for measurement is that, while maximizing the degree of overall measurement discrimination between neurotics (as clinically judged) and normals, we must nevertheless not forget that diagnosis ought eventually to evaluate separately each of the distinct contributory factor-components. For in so far as trait components which contribute to neuroticism are independent of one another, it follows that therapies effective in reducing one may not be effective in reducing the other (as emphasized in Chaps. 11, 14). A person with very high factor X and moderately high factor Y will have the same total level of neuroticism as a person with very high Y and moderate X. But—and this is the point—the former may eventually require an X-oriented therapy (or prognosis), and latter a Y-oriented therapy. In other words, the same total level of neuroticism can mean quite different things for diagnosis and therapy, depending on the relative contribution to it of several distinct neuroticism trait-components. On the other hand, total level of neuroticism, as a sheer summation of contributions from the relatively independent neuroticism-related components, can be a worthwhile datum in the initial categorizing or reconnaissance interview enabling us to determine the degree of need for institutionalization and/or therapy of some sort.

In summary, there are two major uses of the neuroticism batteries for the practitioner and the researcher: (a) as a means of distinguishing the degree of neuroticism according to clinical conceptions, including pinpointing of the critical level where therapy and institutionalization are necessary, and (b) as a beginning guide to diagnosis, prognosis, therapy, and theoretical understanding, by analyzing out the separate contributions of given trait-components to the neuroticism level in any one person.

Multifactor measurement of neuroticism is a much newer development than single factor trait-measurement of Anxiety; hence we cannot now propose for it all the specialized child or state measurement variants which were available for U.I. 24. However, adult trait questionnaire and objective test neuroticism batteries are available in final or nearly final form. Moreover, isolation of state (change-through-time) manifestations of neuroticism is well enough along to suggest a state objective test neuroticism battery, albeit for research purposes only.

QUESTIONNAIRE MEASUREMENT OF NEUROTICISM AS A TRAIT IN ADULTS (THE N.P.F. TEST). This battery is composed of forty-two items from the six questionnaire factors which most powerfully discriminate between clinically judged neurotics and normals (see Chap. 4). The items finally selected were those which (a) best discriminated between neurotics and normals, and (b) at the same time correlated most highly with the primary questionnaire factor they were intended to measure, (c) were well disguised in purpose, that is, did not look too obviously like neuroticism items, and (d) were readily intelligible to a wide range of educational levels and cultural backgrounds. The test has been found to be suitable for a wide educational level and for all but the most severely disturbed patients.

Table 15–8 presents the basic data on the 42-item adult neuroticism questionnaire measurement, which is an improved and intensified version of the Neurotic Personality Factor[5] or N.P.F. Test (194). The handbook for the new test will provide the usual reliability and validity information and also norm tables, which are not available now, and, possibly, several more items per factor than does the test as described below.

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[5] The 1960 version of this test is constructed exactly on the principles described above, but differs enough in detail from the pre-1960 N.P.F. to warrant a slightly different title: The Neuroticism Scale (N.S.Q.). The N.S.Q. is thus nothing but the latest, most improved version of the N.P.F.

TABLE 15-8

A Questionnaire Test Battery for Measuring Neuroticism in Adults (The Neurotic Personality Factor Test)

First-Order Questionnaire Factor	Number of Items	Specimen Item with Neurotic-Direction Response in Italics
E−, Submissiveness	9	The use of foul language, even if not in a mixed group of men and women, still disgusts me. (a) *Yes* (b) In-between (c) No
F−, Desurgent Depression	9	I like to go out to a show or entertainment. (a) *Less than once a week (less than average)* (b) About once a week (average) (c) More than once a week (more than average)
O+, Guilt Proneness	7	If acquaintances treat me badly and show they dislike me (a) It does not upset me a bit (b) In-between (c) *I tend to get down-hearted*
C−, Low Ego Strength	7	I would rather listen to (a) A brass band (b) Uncertain (c) *A good choir, as in a church*
I+, Protected Emotional Sensitivity or Premsia	5	I feel a need every now and then to engage in a tough, physical activity (a) Yes (b) In-between (c) *No*
Q_4+, High Ergic Tension	5	I often feel quite tired when I get up in the morning (a) *Yes* (b) In-between (c) No

BATTERY AS A WHOLE

Reliability: +.75
Clinical Criterion Validity: Total battery discriminates between clinically judged neurotics and normals at $p = > .01$. See following discussion for details.
Administration and Scoring: Virtually self-administering, in group or individual form, requiring about ten minutes, and key-scored.

The weighting of factors and items in the N.P.F. test (Table 15–8) approximates their known power in discriminating neurotics from normals in the R9-Q study (Chap. 4, Table 4–2) and in the R6 study (Appendix I). However, the neuroticism contribution of questionnaire-measured Anxiety (O+, C—, Q_4+) is slightly underestimated, since these components can be separately assessed in the Anxiety questionnaire (see Table 15–1; and 43).

For purposes of more intensive diagnostic evaluation, the clinician will want the patient's score on each of the component neuroticism-contributory factors. The nine-item E— and F— factor estimates in the present battery are probably of just high enough reliability for this purpose (split-half reliability estimated at .70); but for anything more than preliminary diagnosis, the other factors should be eked out by the addition of several more items each from the 16 P.F. (62) until the desired reliabilities are attained (see 16 P.F. Handbook, 62, pp. 3 f., for upper limits; and discussion here, p. 443, for method). Items can also be included for other contributories: L+, Protension, and H—, Threctia. With the above provisos as to reliability in mind, the N.P.F. and supplemental neurotic-contributory questionnaire factor measurements can be used to assess the degree to which patients fit into several of the major traditional neurotic syndrome groups. Table 15–9 summarizes the clues to such diagnoses, based on a fuller presentation of data and discussion in Chapter 7, which the practitioner ought to study carefully before proceeding. Suffice it to say here that many of the relationships described in Table 15–9 need to be confirmed and made more precise on larger samples, an effort to which it is hoped practitioners will contribute as they employ the test in its present, rough, diagnostic form. Classification into syndrome groups is only one of the ways that knowledge of the patient's neurotic-contributory factor-profile helps to understand the particular nature of his disturbance, the probable prognosis, and the necessary therapy. (See Chaps. 4–7, and 14.)

Bendig (16) found that an older version of the present N.P.F. (194) correlated +.63 with the IPAT Anxiety Scale (43) in a sample of two hundred. But, as noted above, the new edition of the N.P.F. weights factor contributions with a view to suppressing the separately measurable Anxiety component; and the relationship is only +.36 for current forms of these two tests, on a sample of 83 (194). Karson and Pool's data (126) suggest that the N.P.F. neuroticism score is quite highly correlated positively with the M_f and S_i scales of the M.M.P.I. (112). The correlations between individual factor-components of the N.P.F. and these scales run as high as .69, and average about .40 to .45. It is therefore reasonable to conclude that the overall multiple correlation would be +.75 or more with each of these two M.M.P.I. scales.

TABLE 15–9

USE OF NEUROTICISM QUESTIONNAIRE MEASUREMENT (THE N.P.F.) TO EVALUATE DEGREE OF BELONGINGNESS IN VARIOUS NEUROTIC SYNDROME GROUPS

Neurotic Syndrome	Factors Expected to Differ Grossly from *Value for Normals*	Factors Expected to Differ Appreciably from *Value for Other Neurotics*
Anxiety Reaction	C− Low Ego Strength	C− Low Ego Strength
	O+ High Guilt Proneness	O+ High Guilt Proneness
	Q_4+ High Ergic Tension	*L+ Protension
	I+ Protected Emotional Sensitivity	
	E− Submissiveness	
Depressive Reaction	C− Low Ego Strength	C− Low Ego Strength
	F− Desurgent Depression	F− Desurgent Depression
	O+ High Guilt Proneness	*M+ Autia, Non-Conformity
	Q_4+ High Ergic Tension	
Conversion Reaction	Q_4+ High Ergic Tension	Q_4+ High Ergic Tension
	O+ High Guilt Proneness	E+ Dominance
		*M− Practical Conformity
		*L− Trustingness
Obsessive-Compulsive Reaction	E− Submissiveness	C+ High Ego Strength
	O+ High Guilt Proneness	E− Submissiveness
	F− Desurgent Depression	O+ High Guilt Proneness
†Psychomatic Disorder or Somatization Symptoms	I− Harric Toughness and Assertiveness	C+ High Ego Strength
	*Q_2+ Self-Sufficiency	E+ Dominance
		I− Harric Toughness
		O− Confidence
		Q_4− Low Ergic Tension

*Supplemental questionnaire factor measurement not in N.P.F. proper.

†The psychosomatic category appears to be lower than other neurotic categories in overall neuroticism level and not higher than normals. This failure to behave functionally like other neurotic syndromes confirms the judgment of the American Psychiatric Association's classification manual (5) in *not* placing psychosomatic disorder as a form of neurosis. As for other non-neurotic syndrome categories, psychopaths are particularly notable for more dominance (E+) and more cyclothymic warmth (A+), relative to neurotics and to normals. (See Table 7-1 for further details.) Similarly, present data suggest that male homosexuals have markedly more Non-Conformity (M+) and Protected Emotional Sensitivity (I+) than do normals or neurotics (footnote 3, p. 402). See Table 6-1 for clues to identifying psychotic trends and see reference 122a for syndrome profile data on other groups of clinical interest too recently received for analysis in the present book.

Since state questionnaire patterns tend generally to conform to trait patterns, the N.P.F. can also serve for the present as a questionnaire measure of changes in state neuroticism levels. The occasions of measurement must, of course, be far enough apart to prevent unwanted transfer effects through recall of items from one testing to another. In any event, use of the N.P.F. for state measurement is at present provisional and primarily for clinical research purposes. Further investigation is needed to determine what special modifications of questionnaire pattern occur in the neuroticism state as contrasted with the trait (Chap. 9). Also needed is a direct checking of changes in questionnaire factor levels against changes in clinically judged level of neuroticism.

Objective test measurement of neuroticism as a trait in the adult. As contrasted with the willingness-to-admit character of Anxiety, there is every reason to believe that in neuroticism, defenses and sheer lack of self-insight will appreciably diminish the accuracy of the patient's questionnaire self-evaluation. Therefore, the disguise and unfakeability of objective test measurement is especially important in assessing neuroticism level.

Table 15–10 presents a suggested objective test battery for measuring neuroticism trait level in adults. This is a special purpose battery, designed to assess overall level of neuroticism in the shortest possible time in an initial reconnaissance interview (Chap. 14). All important neurotic-contributory factors are covered, and there is only negligible test variance (involvement) in factors other than the neurotic-contributories.[6] Tests were selected which (a) loaded at the same time a number of neurotic-contributory factors consistently, at their neurotic-associated poles, and (b) discriminated powerfully, as individual tests,[7] between clinically judged neurotics and normals (in the R6, R9-Ta, and R10 studies, Chap. 5), and (c) ease and brevity of administration were favored, when not conflicting with the first two criteria. All tests in the battery can be administered in either group or individual form, except M.I. 268, which can be administered only in individual form. The entire battery requires about thirty-five to forty-five minutes.

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[6] The impression can easily be gained that the tests in Table 15–10 tend to be largely measures of intelligence. Three of the tests (M.I. 2, 167, and 199) do indeed measure intelligence as well as other neurotic-contributory factors. Their loadings on U.I. 1, or Intelligence, average between +.30 and +.35 (see 39, p. 296). A fourth test, M.I. 609 also probably has a substantial loading on intelligence, although its relation to the factor has never been checked empirically. The other six tests in the battery have been tried out empirically against the intelligence factor (U.I. 1) but none of them load it more than ±.10 (39). Therefore, the relation of this battery to intelligence is about what it should be, in terms of intelligence's actual observed involvement in neurosis, as found in our data (Tables 4–2 and 5–1). The possible impression that something like intelligence is too highly involved in this battery probably stems from the fact that (a) one important trick of test disguise is to make a personality test seem as much as possible like an achievement test and (b) some factor-components in neuroticism, notably Neurotic Debility (U.I. 23−), actually involve a competence and ability to utilize personality resources (69, 193) which looks very much like intelligence, behavior-wise, but is actually uncorrelated with the U.I. 1 factor. In general, the intelligence factor does not have significant correlations with the other neurotic-contributory factors, within the normal range.

[7] Criteria (a) and (b) are, of course, related, but they are not identical.

TABLE 15-10

OBJECTIVE TEST BATTERY FOR MEASURING LEVEL OF NEUROTICISM AS A TRAIT IN THE ADULT

(Tests and Factors Are in the Neurotic Direction)

Test Identification in O-A Battery	M.I. Number	Test Title, in Neurotic-Associated Direction	Neurotic-Contributory Factors on which Test Loads* (Universal Index or U.I. Numbers)
G1	M.I. 2	High Classical Motor-Perceptual Rigidity	1–, 16–, 19–, 23–, 29–
G50	M.I. 6	Slow Ideomotor and Reading Speed	22–, 23–
G27	M.I. 117	Poor (or "Lowbrow") Taste in Social and Aesthetic Matters	16–
G9	M.I. 167	Poor Immediate Memory for Words	1–, 21–, 23–, 29–
G35	M.I. 199	Poor Performance in Simple Computations	1–, 19–, 21–, 23–
G38	M.I. 211	Higher Susceptibility to Annoyance	24+, 28+
I15	M.I. 268	Slow Tempo of Tapping	16–, 21–, 29–
G20	M.I. 282	Few Objects Perceived in Unstructured Drawings	16–, 22–
G44a	M.I. 307	Slow Speed in Letter Comparison	16–, 29–
**	M.I. 609	Poor Spatial Integration: "Where do the Lines Cross?"	Strong relation to U.I. 23– and to clinically judged neuroticism. Relation to other factors is unknown

*A neurotic-contributory factor is one which significantly discriminates between clinically judged neurotics and normals. See Chap. 5 for further data and description of factors.

**This test will be procurable in a revised edition of the O-A Battery (73).

The tests for which O-A identification numbers are given (Table 15-10, first column) can be procured as separate tests in the 1955 O-A Battery (73), with scoring, administration, reliability, etc. These are 1955 versions of the tests, scheduled for republication in improved form within a year or two. Intensive evaluation of each neurotic-contributory component requires the full, six- to ten-test, single-factor batteries (73) for each neurotic-contributory factor, including Protected Emotional Sensitivity (U.I. 16—), Resignation (U.I. 19—), Lack of Exuberance (U.I. 21—), Pathemia or Emotional Immaturity (U.I. 22—), Neurotic Regressive Debility (U.I. 23—), High Anxiety (U.I. 24+), and Low Adaptation Energy (U.I. 29—). It will be noted that the Anxiety factor has been de-emphasized in the special purpose, objective test, neuroticism battery (Table 15–10), since Anxiety is separately measurable elsewhere (Table 15–4).

Exact reliability figures are not now available for the special purpose, objective test, neuroticism battery (Table 15–10) but, pending such information, it can confidently be predicted that reliability will be adequate. The individual tests are of good reliability and a large share of their variance goes into neuroticism-contributory factors (construct validity). As noted before (p. 77), the multiple correlation between the measured neurotic-contributory factors and clinical placements in the neurotic (*vs.* normal) category, ranges from about +.60 to +.90, and linear discriminant function analysis shows an excellent separation, too (only 7 per cent misclassified, neurotics *vs.* normals, see Diagram 15–1). The batteries to which these figures pertain are considerably longer than the Table 15–10 battery, but are not so highly saturated with individual tests which discriminate significantly between neurotics and normals. We therefore expect that the clinical criterion validity of the special purpose battery will be at least +.60 and possibly as high as +.80.

A description of tests, with specimen items follows.

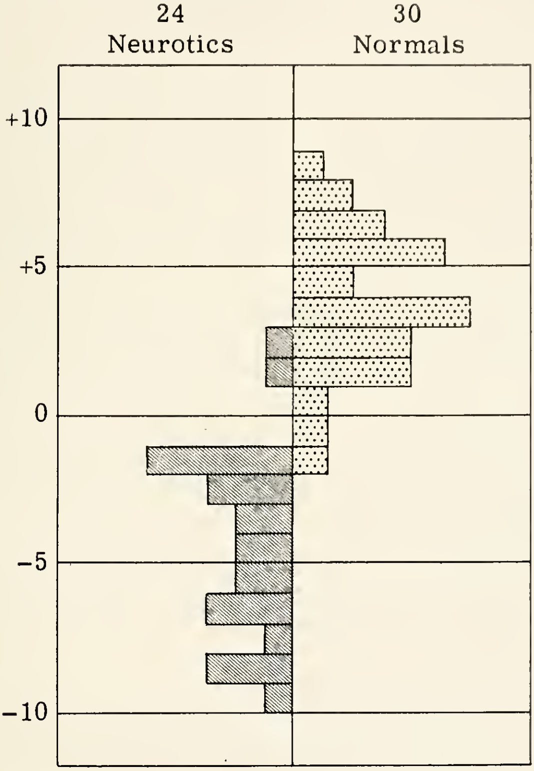
Susceptibility to annoyance (M.I. 211) has already been described as an Anxiety measure (p. 449).

High classical motor-perceptual rigidity, M.I. 2. The patient is given a series of short writing tasks to perform, once in the normal manner and once in a reversed or unaccustomed manner. For example, some tasks are: (a) writing the word "ready," one's own name, or the numbers 1, 2, 3, repeatedly, as quickly and legibly as one can, first normally, from left to right on the page, then reversed, writing from right to left on the line, and also reversing *within* each letter, number or word; (b) writing the sentence, "The sky is deep blue," repeatedly, as quickly and legibly as possible, first normally, then in an unusual manner by doubling each letter in each word (e.g., tthhee sskkyy, etc.), or by alternating between script and block capital letters (e.g., ThE sKy, etc.). Score is the number of units correctly done in the normal performances divided by the number of units correctly done in the reversed or unusual versions of these performances. This score is higher for more rigid and more neurotic persons. The practitioner should not assume that other tests, which look like they involve rigidity, actually measure the same factors as does M.I. 2. Scheier and Ferguson (195) found at least two other distinct factors among tests which looked as though they involved rigidity.

Slow ideomotor and reading speed, M.I. 6. The patient is told to read a fairly simple passage at his natural rate. In the 1955 O-A Battery test, it is a poem, but in a later version of this test, simple prose

DIAGRAM 15-1

FREQUENCY HISTOGRAM OF THE LINEAR DISCRIMINANT FUNCTION FOR 30 NORMAL AND 24 NEUROTIC SUBJECTS ON OBJECTIVE TEST PERSONALITY FACTORS *



* A discriminant function analysis (181, pp. 246-248) was carried out on the mean factor differences on all factors, between 30 normals and the 24 neurotics in the R9-Ta study (see Chap. 5 and Appendix I). The diagram shows the actual distributions of the compound measurement in the two groups tested. The maximum likelihood cut-off point of −0.69 misclassifies two normals and two neurotics or only about 7 per cent of these subjects. Thus, the correct classification of over 90 per cent would seem to be appreciably higher (even allowing for shrinkage on subsequent samples) than that obtained by most current diagnostic techniques.

The above analysis was performed by Owen White, Research Assistant, The Laboratory of Personality Assessment and Group Behavior, University of Illinois.

was used with somewhat better success (67). The patient makes a mark under the last word read as the administrator says "stop" (usually after one minute, but even a 30-second period has been used with good measurement results). Score is simply the number of words read in the assigned period and is lower for more neurotic persons (U.I. 22— and 23—).

A second part of the O-A test can also be used, in which the patient is asked to copy, at his natural pace and in a simple manner, an outline drawing of about a dozen people. Score is the number of figures copied in one and one-half minutes and is lower in neurotics. The reading and the drawing scores can be used either separately or combined.

Poor (or "lowbrow") taste in social and esthetic matters, M.I. 117. The patient checks his preference in each of twenty multiple-choice items designed to compare good or "highbrow" taste with poor, "lowbrow" or undeveloped taste, in the areas of recreation, art, home furnishing, dress, etc. Pictorial as well as verbal items are included. Two specimen verbal items are given below, with score weights in the highbrow direction (2 = most highbrow).

1. Which of the following would you most prefer for an evening's enjoyment?
    (2) A. Ballet
    (1) B. A musical, on the stage
    (0) C. A western movie
2. Which of the following salads would you prefer as a general rule?
    (1) A. Quartered lettuce and store dressing
    (0) B. Coleslaw
    (2) C. Greens, olive oil, wine vinegar

The test is untimed, but should not require more than three to five minutes. Score is number of points, added across all items, divided by the number of items completed. It is lower (or more "lowbrow") in the neurotic, U.I. 16— person.

Poor immediate memory for words, M.I. 167. The patient has one and one-half minutes to look at and memorize (without speaking aloud) a list of eighteen words on a page, with half of these words of emotional content (e.g., terror), and half of neutral content (e.g., circle). After the learning-memorizing run, the subject closes his eyes for thirty seconds, then is given one and one-half minutes to recall as many of the original words as he can. He is encouraged to guess where he is not certain. Minor misspellings which do not cast doubt on the essential correctness of recall are accepted as correct. The score is then the number of correctly recalled words and is lower in the neurotic.

While the above is the usual test format, fairly wide variations in word content and slight variations in timing have been tried and found not to disturb the relationship of this test to neuroticism-contributory factors. In fact, O-A test G9 (Table 15–10) is somewhat different from the test described above.

Poor computational performance, M.I. 199. The subject or patient does as many simple addition problems (adding three two-digit numbers) as he can in two minutes. The problems are printed on the test paper and he is allowed to do any figuring he wishes on the paper. Score is the number of correctly added problems and is lower in neurotics.

Tempo of tapping, M.I. 268. The patient is given a stylus or pencil and told to tap at his natural rate. Score is the number of taps in a single 30-second period (or an average of taps in several 30-second periods) and is lower in neurotics. In our research, this test has always been given in individual form, but group administration seems feasible, without serious disturbance of the present functional meaning of the test. For example, subjects, who may perhaps be equipped with earplugs, may dot with pencils on paper with instructions not to dot in the same place twice.

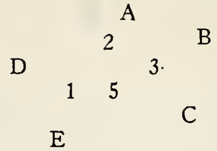
Few objects perceived in unstructured drawings, M.I. 282. The patient has thirty seconds to look at each of eight unstructured (ambiguous) line drawings and write down as many things as he can see in them, one short word to describe each thing. Any word written counts a point, except obviously incomplete words or words repeating a description of the same object for the same picture. Fewer words written (fewer objects perceived) is associated with neuroticism (U.I. 16— and 22—).

Slow speed in letter comparison, M.I. 307. The patient is given thirty seconds in which to compare groups of letters, two groups at a time, marking for each whether the two groups are the same or different. Thus:

			Same	Different
1.	vcen	vcen	______	______
2.	lhkr	lhkr	______	______

A check under "Different" would be the correct answer for item 1, a check under "same" for item 2. A second 45-second run is also given on more difficult (more letters) groups. Score is the number of items checked in any way (correct or incorrect) in the time allotted, excluding items only if both alternatives have been checked. Score is lower in the neurotic (U.I. 16—, 29—).

Poor spatial integration: where do the lines cross?, M.I. 609. This test was designed to measure the degree to which the subject can hold elements of a spatial problem in his head in the process of completing the problem. The subject is given a diagram of the following type:



The problem is to write down the number which is closest to the intersection of two imaginary lines, each defined as subtended by two of the letters in the diagram. For example, the line from A to E intersects the line from D to C approximately at point 1, hence the answer to the problem AE-DC is 1. Other sample problems, with correct answers supplied in the blank are:

AC—BE: 3
EB—DC: 5
AE—DB: 2

The actual test diagram is more complex than the above sample, containing about twenty letters and twenty-five numbers. Some of the numbers are not the correct answers to any problems, and some combinations of the letters are not used to set any problems. The patient is given three minutes to look at the diagram and attempt twenty problems of the type shown above. He is encouraged to guess if he does not know the correct answer and not to spend too much time on a problem which stumps him. While working, his non-writing hand must be at his side, and his writing hand cannot make any movements over the diagram or draw any lines on it. (The diagram is on a sheet separate from the answer sheet). Score is the number of problems done correctly in the time allotted and is lower in neurotics.

Low score on the test loads about .50–.55 on U.I. 23—, Neurotic Debility and also correlates about .50 with clinical judgments of neuroticism *vs.* normalcy in a group of 49 clinically judged neurotics *vs.* 49 matched normals (193; and R6, Appendix I). Though so far checked only against U.I. 23, the probability is high that the test loads other neurotic-contributory factors such as U.I. 1—, and possibly U.I. 29—. The test is somewhat stressful and disturbing and, while it has been demonstrated that institutionalized psychoneurotics can handle it, the practitioner should be prepared to reassure patients.

The tests described above were chosen so that they could be administered easily without special training or equipment. Precision and reliability can be added to the measurement by employing some of the somatic and physiological measures described in Table 10–8, if the special skills and instrumentation required are available.

Objective test measurement of neuroticism as a state in the adult. We have as yet no direct validation of objective test, state measures against change in clinically evaluated level of neuroticism. However, pending such validation, it is suggested that the trait neuroticism battery (Table 15–10) be reapplied at intervals of, say, a month or more to pick up long-term trends in neuroticism level. For short-term fluctuation, we suggest the following brief battery, composed of tests which tend to measure the most important neurotic process factors in their state form, at their neurotic associated poles: *Poorer immediate memory* (M.I. 167, see p. 464), involved in U.I. 19−, 22−, and 24+; *Emotionality of comment* (G36 in the O-A, and also in the published eight-form Anxiety battery, 192a, involved in U.I. 23− and 24+; and *Slower large body movements* (a test which measures the state forms of U.I. 22− and 24+). It must be understood that this is only a provisional and research form for a neuroticism state battery, pending further investigation needed on states. It requires about thirty to forty minutes to administer or much less, if the electrical skin resistance measurement is omitted. For more intensive measurement of total neuroticism level, or level on each individual component, the test battery can be increased by selections from Table 9–6, 10–4, and 10–6.

Summary and Conclusion

1. This chapter provides relatively detailed discussions of tests suggested for clinical research and practice, including information such as reliability, validity, administration, scoring, norms, specimen items, etc.
2. A discussion of general psychometric standards for tests elucidates the authors' position on the nature and value of criteria such as reliability, validity, objectivity, stability of operational reference, size of standardization sample, etc.
3. All the test batteries described are recommended for *clinical research,* and a few are recommended for *routine practice* as well. It is emphasized, however, that clinical research results can have immediate practical applications, for example, a relation discovered between neuroticism level and occupational adjustment or response to a specific type of therapy.
4. A distinction is made between (a) *general purpose batteries,* designed to cover the personality or dynamic realm comprehensively, and (b) *special purpose tests,* which concentrate on one or a restricted sub-set of factors.
5. Three types of general purpose batteries are briefly described: (a) a battery for comprehensive general personality measurement in the *questionnaire* medium of measurement; (b) a battery for comprehensive general personality measurement in the *objective test* medium of measurement; and (c) an *objective-type* battery for systematic, broad cover-

age of the *dynamic* realm. Adult versions are available for all the tests and younger-age versions are available for (a) and (b).

6. Special purpose test batteries are described for measuring level of *neuroticism* and *Anxiety,* in both *trait* and *state* (change-through-time) forms, in both *questionnaire* and *objective test* media of measurement and, for Anxiety, in specially adapted children's as well as adult forms. The tests in each battery are described and specimen items are provided, together with reliability, validity, scoring, and administration information.

7. The ten special purpose batteries described are designed to assess over-all level of neuroticism or Anxiety in an initial reconnaissance clinical interview which determines the degree of disturbance, and whether therapy or institutionalization is necessary. More intensive testing is recommended, to decide more precisely which prognosis or therapy is most appropriate, by (a) pinpointing in any given patient the values for the many different combinations of Anxiety-component or neurotic-contributory factors which could eventuate in a given over-all level, and (b) broadly measuring the entire personality, which provides the setting, context, and only means for completely understanding and treating any given case of neurosis or anxiety (see 4. and 5. above).

8. The description of broadly based, operationally precise, and meaningful tests of neuroticism and Anxiety, is the culmination of our present work. But at the same time it is a beginning, since for the first time it makes possible systematic coordination and evaluation of researches to determine the effectiveness of diagnosis and therapy, through differences in type of person, institution, therapy, and therapist. For we now know what we are measuring in Anxiety and neuroticism tests, and we know it conforms to the common core of clinical judgment as to the nature of these phenomena.

The authors hope that, with the preceding chapters which have made it possible, this last chapter will soon become a first chapter in a science of clinical diagnosis, prognosis, and therapy.

APPENDIX I

RESEARCHES CONTRIBUTING TO THE MAIN DATA IN THIS BOOK: TECHNICAL DETAILS AND AMPLIFYING COMMENT

It was not advisable to interrupt the continuity of discussion hroughout this book in order to describe in detail the researches conributing to our conclusions, for a dozen or more studies often could be mobilized in support of a single point. Accordingly, more detailed and technical descriptions of the main researches have been relegated to this appendix. Inspection of these will provide a surer basis for evaluating the strengths and weaknesses of interpretive development and for continuing research along the lines indicated by the text.

Generally, the most difficult problem is in providing full copies of tests with scoring, administration, etc. Many, but not all, of these and especially those constructed more than two or three years ago, are available in published form (43, 62, 68, 73, 192a, 194).[1]

In this appendix, rather more attention is given to studies which (a) make more central contributions to data development, (b) have not previously appeared in published form, and (c) are not discussed in detail in the text. It is assumed that the usual direction of reference will be from the text to this appendix; hence, we have usually not given the text page numbers where a given study has been discussed. Researches are arranged alphabetically, according to an alphabetic-numerical designation used consistently in this book and in other publications issuing from our Laboratory. Each section in the remainder of this appendix begins with a set of symbols (e.g., *AF, C'1, R9-Q, R10, TD*) which have been used throughout this book, in table column headings and in text discussions, to designate a particular study. Bibliographic references, when available, are given according to the numerical system used throughout the book.

AF. The description of data and design in the text (p. 65, and pp. 75 f.) suffices, since the study provides only indirect, supplementary evidence in terms of our present purposes. The full write-up of the study is available elsewhere

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[1] R. B. Cattell and F. W. Warburton are preparing an up-to-date description of each of the objective tests used in the laboratory, entitled *Objective Personality and Motivation Tests: a Theoretical and Practical Compendium.* To be published by the University of Illinois Press.

(71). It should be noted, however, that the correlations cited in Table 5–1 are weighted averages of the correlations in the original study, combining 132 U.S. Air Force cadets and 93 U.S. Air Force officers.

BRO (*22*). The subjects, 100 normal male sixth graders, were measured on 40 variables, including ten questionnaire measurements and 30 objective tests. This pioneer study preceded sure establishment of marker tests for general personality dimensions, and of the five factors rotated for simple structure only one was allowed to become oblique to the others, which probably helps to account for the low (40 per cent) hyperplane percentage. For the above reasons, this study is considered as providing only suggestive evidence.

C′1 (55). A P-technique study fully described in the reference cited. It should be carefully distinguished from C1 in our research reference system, which is an R-technique study. The subject was a normal adult female, twenty-nine years of age, formerly a university instructor but engaged in domestic duties at the time of the measurements. On 55 consecutive days (excluding week ends), she was measured on 14 objective tests and 17 rating and questionnaire measures, each of the two sets of data being rotated separately for oblique simple structure, with ±.10 hyperplane averaging about 50 per cent. Data are reviewed and integrated with other P-technique data in a separate article (38).

C′2 (60). This is a P-technique, to be distinguished from the R-technique, C2. *S* was a male college student, age 25, who had just completed two semesters and had been dropped from school for low grades. He was considered normal but with some history of peptic ulcer and with (60, p. 7) "strong needs to be dependent and have problems solved for him; and . . . strongly masochistic." Data were obtained on fifty-four days during twelve weeks of experiment, mainly on objective tests of physiological type, but also including some rating and self-rating measures. Twenty-seven rotations for oblique simple structure, for the forty-six variables analyzed, yielded a ±.10 hyperplane count of between 55–60 per cent. C′2 data are reviewed and integrated with other P-technique studies in a separate publication (38).

C5 (40, 44). The *S*s, five hundred male USAF pilot trainees, were measured on 128 response variables (15 questionnaire variables and 113 objective test variables) selected to block in the main personality structures, without undue emphasis on clinical characteristics. Sixteen first-order centroid factors were extracted from the Pearson r matrix and rotated blindly nineteen times to attain an oblique simple structure significant at the .001 level by Bargmann's test (9), with 61 per cent of the variables in the ±.10 hyperplane. A second-order analysis of correlations among first-order factors is reported elsewhere (44, pp. 880 ff.) and contributed to the data in Table 5–2 of the present text.

C6 (40, 44). The *S*s, 250 male USAF pilot trainees, not the same as those tested in the C5 study above, were measured on 64 objective-type tests drawn from among the 113 in the C5 study. Fifteen first-order centroid factors were extracted from the Pearson r matrix and rotated blindly twenty-one times to achieve an oblique simple structure significant at the .001 level by Bargmann's test (9) with 65 per cent of the variables in the ±.10 hyperplane. A second-order analysis of correlations among first-order factors is reported elsewhere (44, pp. 880 ff.) and contributed to the data in Table 5–2 of the present text.

C7 (59). The *S*s, 184 normal 11-year-old children (87 males, 97 females), were measured on 128 objective-type tests with markers for the main personality dimensions. Fifteen first-order centroid factors were extracted from the Pearson r matrix and rotated blindly twenty-five times to attain an oblique simple structure significant at the .001 level by Bargmann's test (9), with 66 per cent of the variables in the ±.10 hyperplane. A parallel study using questionnaire measurement (58) contributed to the children's *Q* data of Table 4–3.

C8 (75). The *S*s, 164 children (82 boys, 82 girls) ranging from six to eight years of age with a mean age of seven years and five months, were measured on 160 variables of objective type, including marker variables for every factor previously found in the objective test realm for pre-adolescents or adults. From Pearson r's among 111 of these variables (the limit set by present Illiac electronic computer techniques), sixteen centroid factors were extracted and rotated for oblique simple structure by the oblimax analytical method plus several hand rotations. By Bargmann's test (9) this simple structure was significant at the .001 level. The remaining forty-nine variables then had their loadings on these sixteen factors estimated through extension analysis, that is, through their correlations over the 164 subjects, with estimates of score on each of the sixteen factors.

C9. The *S*s, 80 children (34 boys, 46 girls), averaging 4.7 years of age, were measured on 81 objective type variables. An attempt was made to cover the personality as comprehensively as possible. From the Pearson r matrix, some twenty centroid factors were initially extracted and rotated blindly for oblique simple structure, which was achieved at between the .05 and .01 level by Bargmann's index (9), with 59 per cent of the variables in the ±.10 hyperplane. This study will be discussed in an article in preparation by D. R. Peterson and R. B. Cattell, provisionally entitled "Personality Structure in Four- to Five-Year Olds by Factoring Oral Questionnaire Responses."

CQ1 (41). The sample of 408 included normal male and female college students, together with male USAF trainees. Factor analysis (for oblique simple structure) found sixteen first-order questionnaire factors, the correlations among which (C_f matrix) were subjected to second-order factor analysis. From the correlations among first-order factors, four second-order centroids were extracted and rotated blindly for an oblique simple structure which proved to be significant at the .05 level by Bargmann's test (9), with 50 per cent of the variables in the ±.10 hyperplane. It is these second-order results, the loadings of first-order *Q* factors on second-order *Q* factors, which contribute to the results in this book, especially in Tables 4–5 and 4–3.

CQ2. This, like the R3 study, is an incremental R-technique. One portion of the CQ2 data has previously been cited as the CQ1 study (in 66, p. 360), but the study as a whole has not been published. Much of the data were secured through the cooperation of Edgar M. Haverland, Research Scientist, Human Resources Research Office, El Paso, Texas. Ninety-five normal male and female college students were measured on item-based estimates of the sixteen first-order *Q* dimensions in the 16 P.F. (62). Eight to ten months later, the same students were measured in the same way on the same sixteen *Q* factors. A matrix of Pearson r intercorrelations was computed between absolute raw score changes (from the first to the second occasion of testing). Six centroid factors were extracted from this matrix, and rotated blindly for the best attainable oblique simple structure. Simple structure achieved only a non-significant .30 value by Bargmann's test (9) with 51 per cent of the values in the ±.10 hyperplane. Resulting data are the loadings of first-order *Q* factors on second-order *Q* factors (see Tables 4–5, 4–3, and 9–1).

CQ3. An article[2] will describe this study's design and data more completely. The *S*s, 168 boys and girls averaging about thirteen years of age, in two American towns, were given the High School Personality Questionnaire (H.S.P.Q.) (51), which measures the primary dimensions in the twelve- to eighteen-year-old range. From the correlation matrix among first-order factors (based on actual cosines between factors) six centroid factors were extracted at the second-order level, then rotated for oblique simple structure. After ten overall rotations past analytical solution by the oblimax method, an unimprovable plateau was reached with approximately 60 per cent of the variables in the ±.10 hyperplane. The final rotated matrix thus yields loadings of first-order *Q* factors on each of six second-order *Q* factors, cited here for the Anxiety second-order in Table 4–5 and contributing to the estimate of mean pattern for all second-orders (child trait, Table 4–3). The first-order *Q* factors measured were: A, C, D, E, F, G, H, I, J, O, Q_2, Q_3, and Q_4. Factors G— and E+ loaded significantly on the Anxiety factor here, but since these loadings do not tend to appear in other studies defining the Anxiety factor, they are not cited in Tables 4–3 and 4–5.

CQ4. The High School Personality Questionnaire (51) was administered to 296 boys and girls, averaging about thirteen years of age. Item-based estimates were made on each of first-order *Q* factors A, B, C, D, E, F, G, H, I, J, O, Q_2, Q_3, and Q_4, for each subject, and the Pearson r matrix among these 14 scores, over the 296 subjects, was computed. From these correlations, six centroid factors were extracted and rotated for the maximum attainable simple structure, which proved to contain approximately 60 per cent of the variables in the ±.10 hyperplane. One of the resulting second-order rotated factors was F(Q)II Anxiety, whose loadings in CQ4 are described in Table 4–5. CQ4 results also contributed to the averaged estimates for child trait patterns in Table 4–3. A fuller report on this study should be published soon.[2]

CR (44, pp. 316 ff.). This is a second-order factor analysis of correlations among twelve first-order factors, covering the personality sphere in the rating medium of measurement. Correlations between the same twelve factors were first averaged over three separate first-order studies, involving a total of 544 persons (mature male adults, male and female college students). From this correlation matrix, six second-order centroids were extracted and rotated blindly for the best attainable oblique simple structure. This proved not to be significant by Bargmann's test (9) and contained only 48 per cent of the variables in the ±.10 hyperplane.

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[2] Cattell, R. B. Anxiety, extraversion and other second-order personality factors in children. *J. Personal,* 1959, 27, 464–476.

D. This is one of a series of studies reported on by Evan Davies (79)—one that has the best convergence in common markers with our main series of studies (79, pp. 79 ff.). The sample consisted of 74 persons (Australians), 40 males and 34 females, with a mean age of 21.9 years. Forty-eight variables were scored and analyzed, including all sixteen first-order factors from the 16 P.F., several measures of intelligence, color-form perception, physical strength, etc., and the following Rorschach indices (Davies' notation): W; D; Dd; M; FM; m; k; K; FK; F; −Fc; C′; FC; Cf; C; R; R/T; −F+%; A%; P; O; M: Sum C; FM + M: Fc + c + C′; 8–10 per cent; and −W:M. Five centroid factors were extracted and rotated for orthogonal simple structure. One of these rotated factors was an excellent match to the Anxiety factor, F(Q)II (see Tables 4–5 and 4–6).

G. This unpublished study was conducted by Lawrence Golding, in the Physical Fitness Laboratory, T.K. Cureton, University of Illinois. That portion of the data cited in the present text is an extension analysis, in which the association of thirty-eight variables with the Anxiety factor was estimated from their Pearson product-moment correlation with an Anxiety factor score, F(Q)II. *S*s were 40 women, averaging 26 years of age, almost all college graduates. The thirty-eight variables related to the Anxiety factor included scores on each of the sixteen first-order *Q* factors from the 16 P.F. (62), the remaining tests being mostly of objective-type, e.g., skeletal, muscular, and adipose indices, physical strength, various measures of pulse rate change to cold pressor or shot stimulus, cholesterol, Schneider index, metabolic rate indices, etc.

H (113). This study, by Edgar M. Haverland, was a P-technique factorization of forty-nine variables predominantly of objective test and physiological type, designed to measure various manifestations of fatigue. The subject, an unmarried male graduate student in psychology, age 24, was tested on seventy-five occasions during a 6-week period. From the Pearson r correlation matrix, eleven centroids were rotated blindly (seventeen rotations) to an oblique simple structure with nearly 60 per cent of the variables in the ±.10 hyperplane. The data and design are thoroughly discussed in the original report (113) and integrated with other data in another report (38).

K (127). This published study by Karson and Pool was on a sample of seventy-one male U.S. Air Force officers who were referred for psychiatric consultation with anxiety diagnosed as playing a key role in the symptomatology. Mean age was 33 years; mean educational level was 14 years; mean IQ, by Wechsler-Bellevue, was 122. Subjects were administered both A and B forms of the 16 P.F. questionnaire (62) to get a maximally stable and reliable estimate of each of the sixteen first-order *Q* dimensions. These sixteen factor scores were intercorrelated by Pearson r, and six centroids were extracted and rotated to orthogonal simple structure. Over-all hyperplane percentage in the ±.10 area was almost exactly 50 per cent. The data in this study contributed primarily to the definition of the Anxiety factor as measured by questionnaire (see Table 4–5) and also to other second-order *Q* factors (Table 4–3).

Knapp. For these previously unpublished data we are indebted to Lt. (jg) Robert Knapp, Head, Division of Psychology, Naval Medical Field Research Laboratory, Camp Lejeune, N.C. Lt. Knapp administered the full Objective-

Analytic Battery (73), U.I. 16 through U.I. 33, to 315 U.S. Navy submarine school candidates at New London, Conn. That portion of his data used here was the scores on each factor for each of the subjects. An oblique factor analysis on these data, conducted at our laboratory, yielded a simple structure with 56 per cent of the variables in the ±.10 hyperplane. This matrix (of second-order objective test factors) was compared and matched with similar second-order data from four or five other studies (C5, C6, R1, R2, and less importantly, R3) to procure the average estimates of second-order *T* factor loadings in Table 5–2. It is expected that a fuller account of Lt. Knapp's study will be published as a Naval Medical Research Laboratory report.

MC. The data and the description of the study were received August, 1958, by Cattell as a personal communication from Dr. G. A. McMurray, who conducted the study in collaboration with Dr. L. B. Jaques and Mr. R. Buckridan at the University of Saskatchewan, Saskatoon, Canada. Raw data received were scores on the following seven variables: sex, total score from the IPAT Anxiety Scale (43), total score from the Taylor Manifest-Anxiety Scale (212), and, finally, four measures involving capillary resistance (base level, maximum reached after application of cold pressor stress, the increase, between the former and the latter, as an absolute value, and as a percentage). Dr. McMurray's description of the capillary resistance (or CR) measurements is printed with permission as follows: "A measureable negative pressure is applied to the volar aspect of the forearm through a plastic cup of inner diameter seven mm, outer thirteen mm, for exactly sixty seconds. The least pressure capable of eliciting one or more petechial (responses) in 60 secs. is taken as the CR. The CR base was measured in the morning usually and again two hours later (approx.). The mean of these measures is the CR base. Then S immersed his hand in ice water at 2°–4° C. for five minutes. This . . . stress test . . . regularly produces a marked rise soon after immersion and lasts three hours or more. Measures were taken at 30-minute intervals for three hours. CR MAX is the highest CR reading obtained (during this period)."

Data cited (Tables 5–4 and 4–6) were based on thirty-one persons in the study, for whom all of the above seven scores were available. There were 20 females and 11 males, all undergraduate students, averaging almost exactly 20 years of age. In analyzing these data, we took the IPAT Anxiety Scale total score as the estimate of the Anxiety factor, F(Q)II, and accepted Pearson r's between it and the other six variables as estimates of their loadings on the Anxiety factor.

MM. The study was conducted by R. B. Mefferd, Jr., L. J. Moran, and J. P. Kimble, Biochemical Institute and Dept. of Psychology, University of Texas, Austin, Tex. Data, reported in mimeographed form, were taken from a study by R. B. Mefferd, Jr., E. H. LaBrosse, and L. J. Moran, obtained with the cooperation of Samuel A. Hoerster, Supt. of the Austin State Hospital, Austin, Tex.

This study's design was described briefly in Chapter 10 (p. 196 and pp. 192 f.). There were 45 variables in the first matrix (78 days with a female schizophrenic undergoing treatment), 51 variables in the second matrix (75 days, later in therapy), and 44 variables, common to the first and second matrices, were analyzed in a third, combined matrix. Rotation for simple structure was made separately on all three matrices by Mefferd *et al.,* and further minor rotations were made in the laboratory of the authors, with combinations of results across all three matrices to estimate average loadings, finally, in Table 10–2. Most of the variables used were of a physiological, biochemical nature, all but a few of which appear somewhere in the left-hand columns of Table 10–2, loading significantly on one or another of the factors. The few somatic or physiological variables analyzed, but *not* loading one of these factors significantly are: phosphorus, uric acid, body weight, sublingual temperature, taurine-threonine, lysine, and valine-methione. Other variables analyzed, but failing to load significantly on any of the three composite factors in Table 10–2, are: average wind speed, sunspot activity, outside temperatures, and speed of copying (correctly) geometrical figures onto matrices of dots.

In general, it should be noted that (i) overnight urine samples covering known intervals were collected daily (blood sample data were not used), (ii) urinary values were reported as rates of excretion, and (iii) standard methods were employed throughout, and several substances were determined by more than one method.

We are most grateful to the above investigators for permitting us to use their data, prior to their own publication of it. It must be noted that, in the space available here, we cannot do full justice to the design and data of such a complex study of such large scope. A mimeographed report on this study has recently been made available, giving further design data, and full unrotated and rotated matrices. As long as it is available, this report can be procured by writing to the MM investigators. This paper, entitled "Use of a Factor Analytic Technique in the Analysis of Long Term Repetitive Measurements Made Upon a Single Schizophrenic Patient," was also presented at the "Symposium on Multivariate Analysis of Repeated Measurement on the Same Individual," at the American Psychological Association meeting, Washington, D.C., 1958.

In a personal communication to Dr. Scheier (November 6, 1959), Dr. Mefferd notes that the MM investigators do not plan to publish this study as a separate report, but will wait until they have accumulated a series of such studies. However, he notes that various aspects of the MM study have been covered in the paper mentioned above and also in the following references:

Moran, L. J., & Mefferd, R. B., Jr. Repetitive psychometric measures. *Psychol. Repts.,* 1959, **5**, 269–275; and

Mefferd, R. B., Jr., Moran, L. J., & Kimble, J. P. Functional systems analysis in Psychopharmacological research. *Transactions of the Fourth Research Conference in Chemotherapy in Psychiatry,* Veterans Administration, 1959.

MR. These data, not previously published, are part of a study conducted by the Institute for Psychosomatic and Psychiatric Research and Training, Michael Reese Hospital, Chicago, in conjunction with our laboratory. The authors assume full responsibility for interpretations of MR data in this text. We further wish to draw attention to the fact that the Michael Reese research team, which included Drs. Roy Grinker, Sheldon Korchin, Helen Heath, Bernard Engel, and Neena Schwartz *et al.*, is now preparing to publish fuller reports on this study than were possible in this text. Most serious attention should be given to the views presented in these forthcoming publications, since the MR investigators have the best possible qualifications for commenting on these data, by virtue of their familiarity with the variables involved and with a line of systematic related research at Michael Reese Hospital.

The MR sample consisted of eight male patients (seven transferred from Chicago State Hospital, one undergoing treatment at Michael Reese Hospital). These patients evidenced symptoms of depression, but were still able to communicate verbally with the examiner in an adequate manner. Although evidence of neurotic-type disorder apparently tended to be present in all the patients, they were not pure neurotics, and final clinical diagnosis converged on the following decisions: two patients—neurotic depression; two—combination of neurotic depression and inadequate personality; three—inadequate personality; one—passive-aggressive personality. Average age was thirty-one, ranging from twenty-one to forty-one.

The patients were measured on thirty-four response and two stimulus variables, all of which are listed in Table 10–3 and are discussed below in order of their appearance in this table. The Interview Stress lasted about thirty minutes (face-to-face) in which the psychiatrist made an attempt to break down the defenses of the patients by irritating them and indicating his knowledge of their psychodynamic problem. The nine variables following in Table 10–3 were objective tests of the U.I. 24 Anxiety factor, derived from an eight-parallel form Anxiety battery constructed in the laboratory of the present authors (see pp. 453 f.). The next four variables, the Affect Ratings, are based on structured interviews in which verbal reports of affective experience were obtained and explored. An additional rater observed these interviews (from a one-way vision room) and independently made ratings. A consensus was then reached as to the value (19-point scale) to be assigned to each of the three affects—anxiety, anger, and depression—as conscious and communicable states. These three ratings are made independently of one another, and the Total Affect is the sum.

Total and free cholesterol were determined by the method of Zak *et al.* (235), the results being expressed as mg per cent. The Cholesterol Ratio is the ratio (R) of free cholesterol (F) to esterified cholesterol (E), as follows: $R = \frac{F}{T} = \frac{F}{T-F}$, where T = total cholesterol. A modified procedure of the method of Nelson and Samuels (166) was employed for the determination of plasma 17-hydroxycorticosteroid levels. Systolic and diastolic pulse pressures were sampled every one and one-half minutes over a period of fifteen to thirty minutes or more. Score is the mean of all samples within a given period. Heart rate was determined by ECG as the average of twenty samples (time required for ten heart cycles) approximately equally spaced throughout the testing period (five to thirty minutes). Times-per-ten-cycles scores were eventually converted to heart rate scores, in beats per minute. Heart rate variability is the standard deviation of the heart rate in the above twenty samples. Respiration rate was measured continuously, the score being the total number of respiratory cycles in the period (at least ten minutes) divided by the total time for the period, given in inspirations per minute.

Certain complexities in the interpretation of the curare stimulus led us to deemphasize this in interpretation, and we also feel it reasonable to assume that its effects on other functional relationships were relatively slight.

Median, instead of mean, amplitude on the four EMG measures was used because these data tend to show skewed distributions. The quartile deviation is the appropriate measure of dispersion. In a personal communication to Scheier, February 16, 1959, Dr. Engel of the Michael Reese research team expresses his doubts whether the EMG figures, as measured in the MR study, reflect muscle tension, but believes they could be interpreted as indicating amount of muscle movement. The method for determining ceruloplasmin was adapted from the method of Ravin (182), involving testing for phenylenediamine oxidase. Urea and non-protein nitrogen (NPN) were determined for trichloro-acetic acid (6 per cent) filtrates by procedures adapted from Natelson (165).

All patients were scored on all thirty-four response variables on each of five successive half-days of testing (over a total period of two-and-one-half to three days). The five scores per patient, on each variable, were brought to a mean and sigma, the same for all patients, in order to suppress inter-individual differences. Presence of interview stress and presence of curare injection were entered as two, absence as one. Finally, the five successive scores on each variable for each of the eight patients were strung together into a chain series of forty entries. We then computed Pearson r's between all of the first twenty-three variables listed in Table 10–3, over the forty person-occasion entries. Eight centroid factors were extracted and rotated for maximum attainable simple structure, which reached 52 per cent of the variables in the ±.10 hyperplane. The remaining thirteen variables had their factor loadings estimated through their Pearson r's with marker-based estimates of each of the eight rotated factors. The first-order rotated matrix described above is given in full in Table 10–3, and portions of it are described in Chapters 9 (Table 9–4) and 11. The second-order objective test state dimensions discussed in Chapter 10 (Table 10–9) were based on correlations between first-order MR factors averaged with correlations between first-order state factors in the R3 study.

R1 (192). For 86 normal male college students, 120 variables were scored, including 97 objective-type response measures, 17 questionnaire measures and six psychiatric evaluations of Anxiety, five by one psychiatrist (free, situational, bound, characterological, overall) and one made independently by another psychiatrist. Marker variables were included for eight of the sixteen main *Q* dimensions and most of the main *T* dimensions. Once the marking of general personality dimensions was achieved, concentration was on known and putative measures of anxiety and neuroticism. Centroid analysis of a Pearson r matrix yielded fifteen factors considered significant. These were rotated blindly twenty-five times to the maximum attainable oblique simple structure, which contained 62 per cent of the variables in the ±.10 hyperplane and was significant at the .001 level by Bargmann's index (9).

The study is discussed at some length in the reference above (192), and another publication (64) concentrates on the loadings achieved by the psychiatric evaluations of anxiety. Previously unpublished was an oblique factor analysis of correlations among first-order *factors,* the results (simple structure) of which contributed to Table 5–2 in the text. Since questionnaire factor scores were entered with objective test scores in the original matrix, Table 4–5 and 4–6 data are from the first-order analysis.

R2 (67). The 86 normal male college students of R1 were measured on 103 variables, four weeks after the R1 testing. Thirty-three questionnaire measures included coverage of all sixteen of the major *Q* factors and seventy objective tests included markers for most of the known *T* factors. Once this marking of major general personality dimensions was achieved, concentration was on putative measures of anxiety and neuroticism.[3] Seventeen significant centroid factors were extracted from the Pearson r matrix and rotated blindly twenty-five times, until the maximum attainable oblique simple structure was reached, containing 62 per cent of the variables in the ±.10 hyperplane and significant at the .001 level by Bargmann's index (9). As in R1, results of a previously unpublished second-order oblique simple structure factor analysis (of correlations among first-order factors) contribute to Table 5–2 in the text.

R3 (65, 70). In this incremental R-technique, scores were absolute raw score changes between the first (R1) and the second (R2) occasion of testing, four weeks later, on sixty-nine identical response variables measured on each of the two occasions. That is, a common core of sixty-nine response variables (seventeen questionnaire, fifty-two objective) were measured in both the R1 study above (first occasion) and the R2 study (second occasion) for the same eighty-six male college students. In addition to these sixty-nine response-change variables, presence (=2) *vs.* absence (=1) of three situational strains was scored. These stimuli were varied systematically between the 1st and 2nd occasions of testing so that (a) each possible on-off combination of the three stimuli at any one occasion, and (b) each possible combination of stimulus changes (off-to-on, or on-to-off) between occasions, occurred for an equal number of subjects. The conditions varied in a two-step, on-off manner were: (a) imminence of examinations, (b) anticipation of treadmill run, and (c) questionnaire-probe stress. These are described further in the text, p. 246, and elsewhere (65, 70).

Fourteen first-order centroid factors were extracted from a matrix of Pearson r's between change scores, then rotated blindly to achieve an oblique simple structure, with 59 per cent of the variables in the ±.10 hyperplane and significant at the .05 level by Bargmann's index (9). This incremental R-technique design permits definition of state (change-through-time) factors and their relation to the three stimulus intensities cited above, through their direct loadings on the state factors. However, the fact that each of the stimuli were varied independently of the other two (correlated .00 with them) reduces the degree to which two stimuli can possibly load the same factor. A second-order oblique simple structure analysis, as in the R1 and R2 studies, was made but has not been published previously to its contribution to this text in Table 10–9, in which it is averaged with data from the MR study, and also, slightly, in Table 5–2.

R4 (63). An extension analysis in which 187 normal, male college students were scored on 21 variables (two questionnaires and 19 objective-test type), all known or putative measures of Anxiety. The U.I. 24 factor score was made from a composite of scores on previously established Anxiety factor markers, and Pearson r's were computed between each of the twenty-one variables and this factor estimate, compensating for auto-correlation, where necessary. These

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[3] The objective test coverage in this study was also enriched by the work of Dr. Stephen P. Quigley, Speech Research Laboratory, University of Illinois. Dr. Quigley administered, to all but a few of the eighty-six subjects, a number of speech amplitude, speed, and articulation measures (with and without auditory feedback). These measures were entered as objective tests in the R2 analysis described above, and Dr. Quigley has also given them more intensive consideration, as related to personality, in a separate report (180).

Pearson r values have been shown to be a quite accurate estimate of what factor loadings would be in a regular factor analysis. The purpose of the study was to replicate and confirm previous Anxiety marker loadings, and to try out a few new variables as markers. Lengthening and redesign of tests was generally successful in that it tended to increase loadings on (intensify measurement of) the Anxiety factor.

R5. Not previously published, this multiple-purpose study had three aspects considered in this text: first, an extension analysis (just as in R4 above, *q.v.*), in which a total of twenty-five known and putative measures of U.I. 24 Anxiety were correlated by Pearson r with a factor estimate of U.I. 24 (from ten known marker variables) as a check on their relation to the factor. The correlations of the the markers with the factor estimate were corrected for self-correlation, as in the R4 study. The main non-marker variables were scores on each of thirteen dimensions previously found in reactions to humor (44). Significant loadings from this part of the study are in Tables 5–4 and 4–6. Second, each of the forms of the eight-parallel-form Anxiety battery (192a) was checked for reliability and factor validity, yielding the data of Table 15–7. A total of thirty-three variables, predominantly of objective type, were measured in the first two parts of this study. Finally, split-half reliabilities were computed for some of the better Anxiety factor markers (see p. 448), in tests which were intact, not split as in the eight-form battery.

The sample was ninety-four college undergraduates, about equally divided between males and females. This study was conducted by the authors and William P. Sullivan, Assistant.

R6. This study has been fully recorded (193). Forty-nine clinically judged neurotics were compared with forty-nine normals on an estimate of the Neurotic Debility factor (U.I. 23), very adequately based on ten of its highest-loading tests. Matching data, neurotics *vs.* normals, is as follows: age, 32.6 *vs.* 32.5 years; education level, 11.2 *vs.* 11.6 grades completed in school; sex, 13 males and 36 females in each of the two samples. To compensate for diagnostic biases which might exist at any given institution, neurotics were drawn from six different institutional centers, always selected as such on the basis of competent clinical judgment only, where there was a minimum of disagreement on belongingness in the neurotic category. Neurotics included fifteen anxiety reactions, seven obsessive-compulsives, four depressives, fourteen in the psychoneurotic-other category, two each of dissociative reaction, conversion reaction, and phobic reaction, and three mixed diagnoses (neurotic and/or passive-aggressive personality). The normals were chosen among non-institutionalized persons, selected at random except for the necessity of matching to neurotics on age, sex, and educational level, and paying them for their services. There were 119 variables scored, all but three or four of which were of predominantly objective type. In addition to the ten markers for the Neurotic Debility factor estimate (Chap. 5), a number of other measurements were introduced to check their relation both to the factor and to clinical judgments of neurosis *vs.* normalcy. The latter data contributed to construction of batteries for measuring neuroticism (see Chap. 15, Table 15–10).

R7. This study (194a) compared the scores of fifty clinically judged psychotics with fifty normals on marker-based estimates of the objective test factors of Neurotic Debility, Anxiety, Imaginative Tension, Introversion, and

Autia (U.I. 23−, 24, 25−, 32+, 34+). Matching data, psychotics then normals, was: age, 40.4, 37.1; educational level, 12, 11.2; sex, 28 male, 28 female; 31 male, 26 female. About half of the psychotics were affective disorders, other half were schizophrenics. All were in fairly advanced stages of remission and—one of the most important findings—were able to handle the tests without undue difficulty. A total of 108 variables were scored, of which some 50 to 60 were of predominantly objective type. However, since one of the main purposes of the study was to check putative measures of U.I. 25− and U.I. 32+, there were only three or four markers apiece for the other factors.

As noted in the text, Chapter 6 (p. 113), the main results were negative, no significant psychotic-normal differences being found on any of the five factors. This, however, fits with questionnaire data which is available for U.I. 24, 32+, and 34+. This exploratory research must be expanded by coverage of a greater range of objective test factors, more intensive measurement of the five reported here, more controlled matching of psychotics and normals, and wider sampling of psychotics of various types, in various stages of remission, etc.

R9–Q. This is actually a series of studies, organized around a central theme—type definition of neuroticism in terms of questionnaire factors. Only a small portion of the data has been published previously, but the text describes the study and its basic data in sufficient detail (pp. 40–45 and Table 4–2).

Available details on the ten sub-samples of neurotics are given below, each group being identified according to the initials used in Table 4–2.

ST: Previously published data on twenty neurotics, from the 16 P.F. Handbook (1950 Ed.).

FO: Data on twenty-seven neurotics courtesy of Dr. Robert Fischer, Consulting Psychologist, Marietta, Ohio.

P: Ten institutionalized neurotics from Peoria State Hospital, Peoria, Illinois, courtesy of Dr. Ernest Klein and Mr. Jerome Yalowitz. All ten were institutionalized neurotics, seven female and three male, averaging thirty-one years of age, with ages ranging from 19 to 49.

W: From Winwick Hospital, Winwick, England, fifteen neurotic males.

K1: This is Dr. Samuel Karson's Group II, reported elsewhere (125) in raw score form with t-ratio analysis. These were forty-eight U.S. Air Force enlisted men, all of whom had been diagnosed as anxiety neurotics by a certified psychiatrist. Dr. Karson notes that almost all of these were self-referrals and were anxious and dependent in interview.

K2: Dr. Samuel Karson's Group III, reported elsewhere (125) in raw score form with t-ratio analysis. In this group there were thirty-seven U.S. Air Force males referred to the psychiatric service from other departments of a military hospital, when psychiatric involvement was suspected by the referring physician. Hostility, aloofness, and obstructiveness were evidenced in interview by these patients.

H: Fourteen institutionalized neurotics at Harrisburg State Hospital, Harrisburg, Pa., courtesy of Dr. Samuel Dubin and Miss Ida Weightman. Ages ranged from 34–58, averaging 48. Average educational level was 11.3 years completed in school. There were eleven females and three males. Depressive reactions predominated among the diagnoses.

C: Nine cases from Champaign County Mental Health Clinic, Champaign, Illinois, courtesy of Dr. Joseph Finney. These were non-institutionalized persons with relatively severe emotional problems; however, the resident clinicians were hesitant in diagnosing as neurotic, unequivocally.

F: Data on fifteen cases, U.S. Air Force men, courtesy of Capt. Sheldon Freud, Chief Psychologist, USAF Hospital, Andrews AFB, Washington, D.C. Average educational level was about Grade 11; average age was thirty years.

E: Six institutionalized neurotics from Elgin State Hospital, Elgin, Illinois; four males and two females. Average age was 46.7 years, ranging from 39 to 56. Diagnoses included two obsessive-compulsives, two anxiety reactions, one depressive, and one "neurosis, other."

In Chapter 7 (pp. 121 ff.), questionnaire factor-profiles were computed by syndrome group, cutting across institutional lines, for those R9-Q patients for whom more detailed diagnosis was available, in terms of particular type of neurotic syndrome. Also added to the syndrome sample were data on the following cases not used in the main R9-Q study: 17 psychopaths, eight from previous data (62, p. 44) and nine contributed by the courtesy of W. G. Currie and M. Tuchtie, Forensic Unit, Toronto Psychiatric Hospital, Toronto, Ont., Canada; 28 sociopaths, of whom 25 were the same persons who provided the objective test data in R10 (*q.v.*); and 14 psychosomatic disorders, most of which were contributed by Dr. Samuel Karson. In most cases, the present authors, from available descriptive evidence, took final responsibility for the decision placing a subject in this category. This was necessary since this particular disorder appears with many different names and is not always clearly differentiated as a category.

All in all, the syndrome proportions in the R9-Q neurotic total sample (N = 201) tend to follow population proportions, and the ranges and averages for age and educational level also seem quite typical. However, the proportions of males to females, military to civilians, and institutionalized to non-institutionalized, are almost certainly higher than in the population. However, it should be noted that in Table 4–2 predominantly female groups (for example, P and H) agree quite well in profile form and level with male groups (W, K1, K2, F). The same could be said of civilian and military groups. However, male-female and military-civilian differences generally tend to be confounded.

Finally we must note that cases from the R9-Q sample were used to determine age trends for neurotics (Table 11–3). Also, within the framework of the R9-Q study are the data on 480 psychotics, the average 16 P.F. profile for which is presented in Table 6–1, with cases distributed as follows:

1. Four hundred and twenty-one cases, measured on Form C of the 16 P.F. (62), by Dr. Stanley Liutkus, Director, Department of Psychology, The New Jersey State Hospital, Greystone Park, N. J. Dr. Liutkus noted that these patients were acutely psychotic, on medication, etc. There were 202 females and 219 males.
2. Seventeen cases contributed from Elgin State Hospital, Elgin, Illinois.
3. Nine cases contributed by Capt. Sheldon Freud, Chief Clinical Psychol., USAF Hospital, Andrews AFB, Washington, D.C.
4. Twenty-two schizophrenic cases and eleven manic-depressive cases, from data previously published (62, p. 44). Further information on this study, including relations between the above subgroups, can be found on p. 111.

R9-Ta. Most of these data were provided through the courtesy of Dr. H. C. Hutchison and Mr. Owen White, Department of Psychiatry, University of Toronto, Toronto, Ont., Canada, working under Canadian Federal-Provincial

Mental Health Grant #605–5–243. These investigators will soon be publishing a full report, including data on abnormal cases other than neurotics, which have not been dealt with in our discussion. A total of fifty-four subjects were tested, twenty-four adults seeking clinical help (with good clinical agreement on the diagnosis of neurosis) and thirty normals. All subjects were Canadians, except for five normals tested in our laboratory. Matching information (neurotics *vs.* normals) is: age, 30.5 *vs.* 27.1; educational level, 10.4 *vs.* 12.6; sex, 15 females and 9 males *vs.* 13 females and 17 males.

In all twenty-four cases, the general diagnosis of neurotic was agreed upon, but sometimes more detailed diagnoses were available, including some with overtones not, strictly speaking, neurotic. These include three anxiety states, three hysterical-personality types, two depressive reactions, and one each with trends to obsessive-compulsive, inadequate personality, alcohol addiction, and psychopathic personality.

All fifty-four subjects were tested on the full 18-factor Objective-Analytic Battery as published in 1955 (73). Factor estimates were made (from marker variables) for each of factors U.I. 16 through U.I. 33, and compared by t-ratio for neurotics *vs.* normals. The same was done for U.I. 1, Intelligence. The results of these comparisons are in Table 5–1. Neurotic-normal comparisons were also made in the same way on each of seven second-order factors (see Table 5–3), by appropriate combination of scores on first-order factors (see Table 5–2). The information on discriminatory power (neurotics *vs.* normals) of individual tests, as well as factors, was used in designing the objective test batteries in Chapter 15.

R9–Tb. Not previously published but described sufficiently well in Chapter 5, pp. 64 f. Resulting data are in Table 5–1.

R10. That portion of the total R10 data which is relevant to the present text is presented in Table 5–1 and discussed on pp. 65 ff. Design aspects related to the data utilized here are adequately described on p. 64.

The twenty-five sociopathic neurotics, institutionalized at Kankakee State Hospital, were all males. The 21 cases for which age information was available averaged 33, ranging from 20–56. Educational level information is now available for only ten of these men, showing an average of 10.4 years completed in school. The term sociopathic personality disturbance plays a prominent part in no less than sixteen of the diagnoses, while alcohol or drug addiction is cited in nineteen of the diagnoses. Nevertheless, these cases were the closest to pure neurotic this large state hospital could provide, upon careful inspection of their records.

The 32 normal control cases were male, undergraduate students (University of Illinois), averaging 19 years of age and 12.7 years completed in school.

ROS (188). Seventy normal male college students were measured on 54 variables, including six questionnaire factors and 48 objective-type tests. Eleven first-order centroids were extracted from the matrix of Pearson r's and rotated blindly for the best attainable oblique simple structure, which, however, just missed statistical significance ($P = .10$ by Bargmann's test, 9) and included only 46 per cent of the variables in the ±.10 hyperplane. Part of the relative poorness of simple structure may be due to a marked density of variables in the Anxiety area.

SM. This study by Dr. Gene M. Smith, Anesthesia Laboratory, Harvard Medical School, Massachusetts General Hospital, was supported by the Medical Research and Development Board of the U.S. Army and the U.S. Public Health Service. The report was received in a personal communication to Cattell, June, 1957, and is entitled "Six Measures of Self Concept Discrepancy and Instability: Their Interrelations, Reliability, and Relations to Other Personality Measures." Part of the report has been published recently (206).

The study is much broader than that portion of it which is cited on p. 265 and described here. By a card-sorting technique, twenty-four college men rated themselves (a) on each of twenty-nine phrases on "Ideal Self" (would like the behavior or actions to be characteristic of himself all or most of the time), and (b) on each of twenty-nine phrases on "Self," but rating for the characteristics as they are in him, rather than as he would like them to be. The amount of superiority of "Ideal Self" over "Self" was correlated by Pearson r with forty-nine personality measures, including each of the sixteen *Q* dimensions measured by the 16 P.F. (62). The correlations for the anxiety-component factors are given on p. 265. Other high ones (with superiority of "Ideal Self" over "Self") are: factor B, Intelligence = +.63; I, Premsia = +.47; Q_2, Self-Sufficiency = +.45, and M, Autistic Non-Conformity = +.44.

Stimulus-Controlled P-Technique. Same as MR, described previously in this appendix.

TD. The design of the study and the methodological problems involved in its execution have been discussed by Damarin in papers presented at the 1958 and 1959 APA conventions.[4] The data came from a study by J. B. Trunnell, M. D. Anderson Hospital and Tumor Institute, University of Texas, Houston, Texas. A pilot factor analysis of data from one of Trunnell's patients was begun in Texas by F. L. Damarin and completed in the authors' laboratory with the continuing assistance of the M. D. Anderson Hospital Staff and its director, R. Lee Clark, Jr. Dr. Damarin, at present a Research Associate in the authors' laboratory, contributes the following comment.

"The TD research cited by Cattell and Scheier in their chapter on the physiological expression of anxiety (Chap. 10) is a pilot factor analysis of variations in the metabolism of one male cancer patient. This particular study was not therefore aimed at anxiety. It was aimed at determining whether Cattell's P-technique factor analysis would throw enough light either on prostatic cancer or on metabolism to warrant more extensive use in studies of therapy.

"A brief description of this pilot study is perhaps in order. Metabolic, enzymatic, and hormonal variables measured thrice weekly over a period of twenty months in a single, prostatic cancer patient provided the empirical data for the pilot study. From this wealth of information three separate factor analytic studies were constructed, each based on a separate phase of the patient's illness and treatment. Phase I was marked by rapid improvement, as the rate of tumor growth was slowed to a stop by the administration of estrogen. Phase II was one of optimal remission accompanied by small, almost imperceptible, increases in the rate of tumor growth. In phase III the rate of tumor growth rose abruptly. There was increasing pain and discomfort followed by death.

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[4] Damarin, F. L., Jr. "The Factor Analysis of Time Series as Applied to a Problem in Cancer Chemo-Therapy." Paper read at Amer. Psychol. Assn., Washington, D.C., 1958, and "Multivariate Studies Involving the Time Dimension." Paper read at the Amer. Psychol. Assn., Cincinnati, Ohio, 1959.

"Approximately 63 observations were included in each factor study. In the first phase, 35 variables were measured, 41 in the second, and 47 in the third phase. All of these were selected by Trunnell either for their relevance to the hormone-tumor relationship or for their importance in measuring general physiological processes important to the patient's welfare, including nitrogen, phosphorous, sodium, and potassium metabolic rates. Although strength of analgesic drug dosage was included as a variable, no personality variables were included to cover the personality sphere generally or to cover such specialized topics as anxiety and stress.

"Factor analysis and rotation to oblique simple structure were carried out at the University of Illinois by Cattell and myself. Cattell and Scheier then examined the first-order factors in the light of the concepts about anxiety and stress presented in this book.

"At the time the book goes to press, Trunnell and I have had an opportunity to conclude only that the results of the pilot study definitely encourage further work. We have not had an opportunity to attempt a definitive interpretation of each factor in the pilot study, nor have we discussed among ourselves the interpretations provided by Cattell and Scheier. We are currently working on the analysis of new data. When this is complete, a number of types of factor analytic study on prostatic cancer patients can be evaluated for the meaning of the factors in individual patients and for the stability of factors among several patients. Thorough consideration of the proposals of Cattell and Scheier must be deferred until that time.

"As a psychologist one can only express regret that more psychological variables could not have been included in our cancer studies. And yet, the interest of psychologists like Cattell and Scheier in physiological data is most encouraging. The TD study may well be the first multivariate work on general metabolism, as well as the first to deal with a fatal illness. As such, the study is expected not only to exemplify new research methods but also to provide concepts and facts that will be of use in further work in physiological psychology and psychosomatic medicine."

W (221, 222). Besides the original references, this study is discussed and reviewed in an integration of P-technique researches (38). Essentially, thirteen factors were rotated to oblique simple structure in P-technique data on a normal male, age 23, attending graduate school. The fifty-two variables correlated (by Pearson r) were of objective-test type, largely of physiological nature. The subject was measured on these variables on each of 110 days. By extension analysis, some rating data were also employed.

Warburton. These very recent data were contributed by the courtesy of Dr. F. W. Warburton. These data have not previously been published, but will be, with the provisional title, *A Comprehensive Study of Mental Test Scores and Biographical Data on Students in a University Department of Education in Britain*, by F. W. Warburton, H. J. Butcher, and G. Forrest. The subjects, 112 graduate students in the Department of Education, University of Manchester (England), volunteered for the study, out of a total possible group of 131 in the department. These students were tested on (a) all sixteen questionnaire dimensions of the 16 P.F., (b) the Kuder Preference Record, (c) the

Allport-Vernon Scale, (d) the Manchester Scale of Attitudes in Education, and (e) Eysenck's Social Attitudes Scale. Scores were intercorrelated by Pearson r, then centroid factors were extracted and rotated obliquely for simple structure. That portion of the data which relates to the second-order questionnaire factor of Anxiety, F(Q)II, is cited on page 440.

We (219). The data here represent part of a study by Dr. Harold Wells, Physical Fitness Laboratory, T. K. Cureton, Dir., University of Illinois. Using eighty of the same college students who were tested in the R1 study, Wells measured on thirty-eight physical fitness variables of physiological and physical performance type; for example, various physical strengths, motor coordination and somatotype indices, various cardiovascular indices, etc. By extension analysis, these variables had their loadings estimated on the fifteen personality factors found in the R1 study.

APPENDIX II

GLOSSARY

Abcultion. The low-score (negative) pole of the personality factor dimension of Comention-Abcultion. Abcultion, or lack of Comention (*q.v.*), involves rejection of acculturation and is indexed as objective test factor U.I. 20−.

Adaptation Energy or Responsive Will. A personality dimension, indexed as objective test factor U.I. 29. Characterized by a high level of energy and strength of will, with adaptive, alert, and effective handling of a wide variety of environmental situational demands. Appears similar to the Mobilization factor U.I. 23+ (*q.v.*), but is statistically independent of it and differs by nature in that it is a coping with immediate environmental onslaughts rather than a following out of an internally originated plan.

Adaptation Stress *vs.* Withdrawal. A personality dimension involving mobilization to face the challenge of adaptation with Effort Stress (*q.v.*) and Adrenergic Response (*q.v.*), rather than leaving the problem unsolved with withdrawal and retreat, Anxiety and Torpor (*q.v.*). A second-order factor among states, near in meaning to Selye's General Adaptation Syndrome.

Adjustment Index, A. Same as Integration Index (*q.v.*).

Adjustment Process Analysis (APA) Chart. An abstraction and reduction to a system of the sequences of response possible to the organism in its goal-seeking behavior. An attempt at comprehensive schematization of successive paths and choice-points (Dynamic Crossroads) in the adjustment of the organism, including possibilities for frustration, conflict, and personality learning. (See Chaps. 12 and 13.) Also known as Dynamic Flow Chart. Same as Path Personality Chart.

Adrenergic Response State. A dimension of personality change indexed as factor P.U.I. 5 and characterized at its high-score pole by rapid pulse, high diastolic pressure, high blood sugar, high erythrocyte count, and, generally, indications of the presence of adrenalin. A short-term "emergency" response (pain, fear, terror), but the triggering stimulus can also be vigorous interaction of a pleasant kind. Seems to be part, but not all, of what is normally meant by stress response (see Adaptation Stress).

Analytic Adjustment Matrices. The systematic arrangement of values in cells which permits calculations leading to various personality change and path-choice indices in Analytic Adjustment Theory. (See Diagram 13–2, Table 13–2, and associated discussion.)

ATTENUATION. The lowering of a correlation between one score and another due to unreliability and error in the measurement which establishes either or both of the scores.

AUTIA. The high-score pole of a personality dimension characterized by non-conforming, impractical, "Bohemian," dissociative behavior, with intensive subjective, autistic, inner intellectual life. Involves maladjustment to, and rejection by, social milieu. Appears as first-order questionnaire factor M+ and associated first-order objective test factor U.I. 34+. Opposite of PRAXERNIA (*q.v.*).

CENTROID. Term referring both to a method of extracting FACTORS from a correlation matrix and to the factors extracted by this method. Centroid factors are *un*ROTATED factors. See also FACTOR and FACTOR EXTRACTION.

CLINICAL CRITERION VALIDITY. The relationship between a test or factor score and a clinical judgment, for example, the ability of a factor score to discriminate between clinically judged neurotic *vs.* normal groups (see TYPE DEFINITION) or the correlation between a factor score and psychiatric estimates of anxiety level.

COGNITIVE-DYNAMIC INVESTMENT STRAIN. A concept referring to the difficulty in having to remember and attend to a large number of minutiae, in order to achieve and maintain goal satisfactions.

COMENTION. The high-score (positive) pole of a personality dimension characterized by conformity to cultural standards, acceptance of authority, rigidity, and, probably, repression. An objective test factor indexed as U.I. 20+.

COMMON TRAIT. A set of personality characteristics (dimension, TRAIT, *q.v.*) which has essentially the same form or pattern of expression for all people and on which, therefore, all people can be given a meaningful numerical value. Intelligence and introversion are examples. Contrasts with idiosyncratic expression in a UNIQUE TRAIT (*q.v.*).

COMMUNALITY. The sum of squares of factor loadings of a given variable or test. Essentially, indicates the amount of information (in a variable or test score) which is accounted for by the factors which have been extracted.

CONCEPT VALIDITY. Same as CONSTRUCT VALIDITY.

CONDITION-RESPONSE DESIGN. A design in which intensities of applied environmental conditions are entered as scores along with response levels. All scores are then intercorrelated and factor analyzed. The relation of environmental conditions to personality response dimensions is given by the loadings of these conditions on the factors.

CONFLICT ANALYSIS BATTERY. A measurement battery yielding quantitative statements on the nature and intensity of a person's conflicts. Objective motivational tests, measuring dimensions applicable to all persons are included with a sampling (by RECONNAISSANCE TEST) of the most important symptoms, complaints, and areas of conflict specific to the person under study. All these measurements are repeated over at least fifty occasions, then analyzed by P-TECHNIQUE (*q.v.*) factor analysis.

Conflict Index, C. A statistic which gives an exact value for the total amount of energy which an organism (or other dynamic system) has bound up in internal conflict. See Chapters 13 and 14. Gives an estimate of intensity of conflict, based on measurements from the Conflict Analysis Battery.

Construct Validity or Concept Validity. The extent to which a test or operation measures a defined concept or construct, as determined by a correlation coefficient. Since it is mostly factor concepts that can be given measurable form, the term as used in this book refers to a test or test battery's correlation with (loading on) a factor, where the factor is an operationally defined representation of a concept.

Cooperative Factors (Cooperativeness). Two factors loaded by at least several variables in common, the same variable loading on each of the two factors in the same direction. Cooperative factors may or may not be correlated in factor space; that is, they may be either Oblique or Orthogonal (*q.v.*).

Correlation Matrix. A triangular or square arrangement of cells which gives the correlation between all possible pairings among the variables (e.g., test scores, etc.) studied.

Correlational Extension Analysis. Same as Extension Analysis.

Corticalertia. The high-score (or positive) pole of a personality dimension, characterized by speed and alertness in reactions and ability to handle environmental or emotional problems in a rational (cortical) and objective manner. Indexed as first-order objective test factor U.I. 22+ and second-order questionnaire factor F(Q)III−. Appears as a characterological Trait and also as a fluctuating State factor. Opposite pole of the factor is Pathemia (*q.v.*).

Critical Path. In the Adjustment Process Analysis Chart (*q.v.*), the path leading to the next choice-point (Dynamic Crossroads) in the adjustment of the organism. As distinguished from other paths ending at a given crossroads or feeding back into previous crossroads. See Chapters 12 and 13.

Crossroads. Same as Dynamic Crossroads.

Cyclothymia. The high-score (positive) pole of a personality factor-dimension found in questionnaire data, characterized by warmth and sensitivity. Indexed as Factor A or U.I.(Q)1.

Deflection Strain. The strain occasioned by the organism's acceptance of goals or paths-to-goals that are substitutes, in the sense of not being innately preferred; for example, escaping a fire by first moving towards it. Similar to the concept of sublimation, but broader in that it includes acceptance of substitute paths as well as substitute goals.

Desurgency. The low-score (negative) pole of a personality dimension, characterized by depression and sluggishness and believed to be related to the total punishingness of past experience. Indexed as questionnaire factor F− or U.I.(Q)6−. Opposite pole is Surgency (*q.v.*).

DISCRIMINANT FUNCTION. A statistic which combines and weights test scores on each of two or more groups of persons, so as to give the maximum differentiation between these groups on these test scores.

DYNAMIC CALCULUS. Broadly, any application to motivational variables of factor analysis or related multivariate quantitative techniques.

DYNAMIC CROSSROADS. Choice-points in the adjustment of the organism, permitting sequences of alternative responses in goal-seeking behavior. These choice-points, plus the paths leading to and from them, compose the ADJUSTMENT PROCESS ANALYSIS CHART (*q.v.*).

DYNAMIC FLOW CHART OR DIAGRAM. Same as ADJUSTMENT PROCESS ANALYSIS CHART.

DYNAMIC LATTICE. A diagrammatic representation of the relation between an individual's goals and the relatively fixed habits which serve his dynamic purposes (attitudes, interests) in achieving these goals.

EFFORT STRESS. To be distinguished from the dictionary usage, which is too general for psychological use, and possibly from Selye's General Adaptation Syndrome which may be broader. Effort Stress is a psychological and physiological response pattern, different from both anxiety and the ADRENERGIC RESPONSE pattern, which is characterized by raised ketosteroid excretion, increased pulse rate and by psychological indications of concentration and effort, but not of emotionality. Indexed as STATE factor P.U.I. 4. One of the components in the broader second-order factor of ADAPTATION STRESS (*q.v.*). This latter factor comes closer to providing an operational definition of the general, broad, clinical concept of stress.

EGO STRENGTH. With initial capitalization, the term refers to a factor-dimension operationally defining major aspects of this clinical concept. Indexed as questionnaire factor C or U.I.(Q)3. A second-order factor among objective tests, called EXPANSIVE EGO (*q.v.*), may also embody certain aspects of the ego strength concept, but its relation to factor C is unknown and unlikely to be perfect.

ENLIGHTENED AFFLUENCE. The pole opposite to NARROW POVERTY (*q.v.*) in a factor-dimension describing differences between nations. Characterized by high material standard of living with political and social emancipation.

ERG. A drive that has been demonstrated by the factor analysis of dynamic variables to be a unitary entity. A factor found in dynamic measures, operationally defining a specific drive or instinct, as clinically and biologically recognized, for example, sex, self-assertion, fear, etc. To be distinguished from drive in general or ERGIC TENSION.

ERGIC REGRESSION. The STATE (change-through-time) form of the personality TRAIT of NEUROTIC REGRESSIVE DEBILITY (*q.v.*). Indexed as P.U.I. 8.

ERGIC TENSION. Tension resulting from unsatisfied (frustrated) drive of any sort. Stimulated but undischarged energy arising from any drive (or ERG). Represented operationally by a factor-dimension in questionnaires, indexed as Q_4.

Expansive Ego *vs.* Poor Emotional Problem-Solving. A Second-Order factor among objective tests, and thus a very broad personality dimension. The Expansive Ego (positive) pole involves a spoilt, egoistic, over-relaxed, untutored and luxuriant ego which is inflated by success, as distinguished from a strong ego in the strict clinical sense. However, it may represent one of the senses in which ego strength is used. Indexed as F(T)II. See also Ego Strength.

Extension Analysis or Correlational Extension Analysis. A brief but reasonably accurate method for estimating the loadings which a variable would obtain in full-scale factor analysis. The correlation of a variable with a Factor Score is taken as an estimate of its loading on the factor. The factor score itself is a weighted composite of variables known to load the factor highly in full-scale factor analysis.

Extraversion. When used without initial capitalization, the term refers generally to the well-known clinical concept of extraversion. When used *with* initial capitalization, the term denotes a factor defined operationally as in the center of the semantic consensus as to the nature of extraversion, but not covering everything ever attributed to this concept. See Exvia.

Exvia. The technical name for the factor-dimension found in the area semantically defined as Extraversion (*q.v.*). This special term is necessary because the factor does not comprise all of what everyone has attributed to the extraversion concept. The factor is found as a second-order factor in questionnaires and a first-order factor in objective tests, indexed respectively as F(Q)I— and U.I. 32—.

Factor. End result of Factor Analysis (*q.v.*). Dimension or single direction of co-variation which parsimoniously describes the correlations in a correlation matrix. Factors have at least descriptive usefulness as personality dimensions (State or Trait) and also, after rotation and confirmation in several studies, can be interpreted as influences governing personality (see Source Trait).

Factor Analysis. A multivariate statistical method for achieving an agreed-upon, unique resolution of observed correlations among a mass of variables into a limited number of Factors (*q.v.*), that is, dimensions or influences, capable of accounting for the complex relations among the variables. (See Chap. 3.)

Factor Extraction. The process of determining how many dimensions of co-variation (Factors) are necessary to account for the information in a Correlation Matrix. Factors must be extracted prior to the Rotation which determines their existence and meaning as personality dimensions. In this book, the Centroid method of factor extraction is used, and a Centroid factor is one which has been extracted from a correlation matrix but not yet Rotated.

Factor Loading. See Loading.

Factor Score. Quantitative estimate of a person or group of persons' endowment on a factor-dimension, computed from their scores on a weighted combination of the test variables loading that factor.

Factor-Centered Approach. Same as Trait-Centered Approach.

First-Order Factor. A factor describing the correlations among test variables, or other scores taken directly from the persons observed. To be distinguished from a Second-Order Factor, which is a factor describing the correlations among first-order factors.

Flow Chart. A diagram representing the successive choice points in the Adjustment Process Analysis Chart and assigning the percentages with which the choices at each crossroads are made in the general population.

Frustration Response. A personality dimension showing, at its high-score (positive) pole, anger, chagrin, depression and control characteristics which suggest that it is a reaction to frustration. A second-order factor loaded by the first-order State factors of Pathemia (*q.v.*) and Adrenergic Response (*q.v.*).

General Purpose Test or Battery. A test or test battery which aims for comprehensive, overall coverage of personality traits, without special concentration on any one personality area or orientation to any one particular criterion. Contrast with Special Purpose Test.

Harria or Harric Assertiveness. The high-score (positive) pole of a personality dimension, characterized by toughness, decisiveness, assertiveness, realism, and, generally, "tough-mindedness." Terms refer to aspects common to two factors: questionnaire factor I— and objective test factor U.I. 16+, although, usually, one or the other factor will be specified in the context, since the two factors are not identical empirically. The term Harria is used for either factor, but Harric Assertiveness usually refers specifically to U.I. 16. Opposite pole of this factor is Premsia (*q.v.*).

Hyperplane. The set of variables whose loadings on a factor are not significantly different from zero. In Rotation for Simple Structure, the factor is placed at right angles to the hyperplane which, when visually plotted, forms an ellipse or disk in factor space.

Hyperplane Count. The number of variables (usually, test scores) with essentially zero loadings on a factor or set of factors. Thus, the number of variables in the Hyperplane (*q.v.*). The hyperplane count is higher as Simple Structure is approached.

Hypothesis of Existence. The hypothesis that, whatever its nature, a given factor is a stable, replicable response pattern and will, therefore, appear in essentially similar form in a range of different samples of persons and situations.

Hypothesis of Nature. Same as Interpretive Hypothesis.

Incremental Factor Analysis or Incremental R-Technique. The basic values are differences between scores on each of a set of variables measured at two occasions. These difference scores are correlated and factor analyzed. One of the two main methods of determining dimensions of personality change-through-time (State factors). The other method is P-Technique (*q.v.*).

INDIFFERENCE OF MEDIUM or INDICATOR. The principle that a personality dimension exists regardless of the form or existence of some particular scale or type of measurement. Thus, the same trait or factor can usually be measured by a number of distinct tests in either QUESTIONNAIRE, RATING, or OBJECTIVE TEST media of observation. See also TRAIT-CENTERED APPROACH.

INDIVIDUAL TEST. A test which can be administered to only one person at a time.

INITIAL CATEGORIZING EXAMINATION. Recommended exploratory examination in clinical practice to decide roughly the general nature and severity of a given individual's problem. If possible, to be followed by more intensive examination. See Chapter 14.

INTEGRATION INDEX, I, or ADJUSTMENT INDEX, A. A statistic showing the degree of freedom from conflict in the total personality. $I = 1 - C$, where C is the individual's CONFLICT INDEX (*q.v.*).

INTEGRATIVE LEARNING. A type of rewarded learning, important for personality development, in which the organism learns to make a choice or compromise between different goal satisfactions in the interests of a greater satisfaction (of all drives) for the organism as a whole. A learning to control by adjusting goals as distinct from MEANS-END LEARNING (*q.v.*), which is simply learning of paths to a given goal.

INTERPRETIVE HYPOTHESIS or HYPOTHESIS OF NATURE. A proposition as to the nature of the personality dimension or influence which could produce the observed pattern of variables found consistently to load a factor. The hypothesis is testable by determining whether given variables, with content related to the hypothesized nature of the factor, load or fail to load the factor as predicted.

INTROVERSION. One pole of the well-known personality dimension whose opposite pole is EXTRAVERSION (*q.v.*).

INVIA. The high-score (positive) pole opposite EXVIA (*q.v.*) on the INVIA-EXVIA personality dimension. A technical name for the factor operationally defined in the center of the semantic area of INTROVERSION. Indexed as second-order questionnaire factor F(Q)I+ and first-order objective test factor U.I. 32+.

ITEM. As used in this text, a single scoreable unit in a test which is composed of a number of such units. For example, any single question in a questionnaire test or one problem of a set of similar problems in a test of numerical facility.

L DATA. Life-record data, obtained by Rating the individual as he reacts in life-situations. Quantifiable data not arising from standard key-scored tests; hence, subject to disagreement among observers as to the score value to be assigned a given performance. *L* Data constitute one of the three MEDIA OF OBSERVATION, the other two being *Q* DATA and *T* DATA.

LOADING or FACTOR LOADING. Essentially, the correlation between a VARIABLE (usually, a test score) and a FACTOR.

LONG-CIRCUITING. The renunciation of immediate satisfactions in the interests of attaining relatively remote goals. A recently discovered, objective test factor, indexed as U.I. 35, is believed to embody the most important features of this concept.

MALERGY. Any STATE (relatively temporary condition of the organism) characterized by inefficient, subnormal, or maladaptive functioning; for example, fatigue, anxiety, confusion. Malergies are thus one sub-class under STATES; and not all states are malergies.

MARKER VARIABLE or MARKER. A VARIABLE (*q.v.*), usually a test score, previously known to LOAD (correlate with) a factor highly and consistently through different studies. Therefore, (a) a marker which loads highly on a factor helps to identify that factor, and (b) scores on marker tests can be used to estimate scores on the factor (FACTOR SCORE).

MASTER INDEX (M.I.) NUMBER. A number indexing a particular objective test VARIABLE (score) and retained constant from study to study, thus enabling ready identification of this variable. For example, M.I. 104, M.I. 582, etc., in which each number refers to a different variable. Several different variables may be scored and indexed from the same test. Compare with U.I. or UNIVERSAL INDEX NUMBER which performs a similar indexing function for FACTORS.

MATRIX. Essentially, any systematic arrangement of rows and columns of numbers.

MEANS-END LEARNING. A type of rewarded learning in which skills are acquired for the purpose of achieving a single, relatively restricted goal, usually tangible and external; for example, a rat satisfying hunger by running a maze. Contrast with INTEGRATIVE LEARNING.

MEDIUM OF OBSERVATION. A general type or mode of measurement through which personality can be quantified. The three media of observation are (*q.v.*) (a) QUESTIONNAIRE (*Q* DATA), (b) OBJECTIVE TEST (*T* DATA), and (c) RATING (*L* DATA).

MISPERCEPTION TEST. A test in which the person's deviation from the norm in perception is used as a measurement of his personality.

MOBILIZATION. The high-score (positive) pole opposite to Neurotic Regressive Debility on the personality dimension indexed as objective test factor U.I. 23. Thus, absence of NEUROTIC REGRESSIVE DEBILITY (*q.v.*).

MODIFYING FACTORS (MODIFICATION). Two factors having several of the same variables in their loading patterns, where some of these variables load both factors in the same direction and some in opposite directions (+ on one, — on the other).

MOTIVATIONAL ANALYSIS TEST (M.A.T.). A test which measures a wide range of dynamic traits, both drives and sentiments. A GENERAL PURPOSE (*q.v.*), OBJECTIVE TEST (*q.v.*) battery for measuring the principal ERGS (*q.v.*) and sentiment systems in the motivational realm.

MULTIFACTOR THEORY OF NEUROSIS. The proposition that neurotics and normals differ significantly from one another on more than one distinct personality dimension (factor); hence, that both the determination and expression of neurosis are complex.

Multifactor Theory of Stimulus Condition Effects. The proposition that any single environmental condition will tend to produce significant changes along two or more distinct response dimensions (factors).

Multiple Abstract Variance Analysis (M.A.V.A.) Design. A research design for discovering relative proportions of environmental *vs.* hereditary determination for personality traits (Nature-Nurture Ratio).

Multivariate Approach, or Experiment, or Research. Dealing with many variables at a time, as responses, or manipulated conditions, or both. Factor Analysis (*q.v.*) is the main multivariate technique applied in this book. Contrast with Univariate.

Narrow Poverty. The pole opposite to Enlightened Affluence (*q.v.*) on a factor-dimension found in the correlations between characteristics of nations. Narrow poverty is characterized by lower material standards of living, less political and social emancipation, and an indicated higher average level of anxiety in the nation's individuals.

Nature-Nurture Ratio. A statistic giving the extent to which endowment on a personality trait tends to be fixed genetically rather than determined by environmental experience.

Neurotic-Contributory Factor. A factor, the scores on which significantly discriminate between (clinically judged) neurotics and normals; hence, a factor which is assumed to operate as an influence determining the severity of neurosis and its mode of expression. A factor which Type Definition places as in the area of neurosis.

Neurotic Phase Factors. Those State (change-over-time) dimensions which, when they are high at the same time, can place a person temporarily in the neurotic pattern, if and as they act in concert with more fixed characterological Traits contributing to neuroticism. A concept for states roughly paralleling that of Neurotic Contributory or Neurotic Process for traits.

Neurotic Process Factor. A characterological Trait factor whose scores are of crucial importance in influencing the severity and expression of neurosis. Among Neurotic Contributory factors, that subclass which most significantly and meaningfully discriminates between neurotics and normals, hence is believed to be central in the etiology of neurosis.

Neurotic Regressive Debility or Regression. The low-score (negative) pole of a personality factor-dimension, characterized by rigidity, exhaustion, incompetence, regression of interests, and, generally, inability to mobilize habit resources in the following out of an internally originated program. Neurotics have significantly higher Neurotic Regressive Debility than do normals. Indexed as objective test factor U.I. 23−.

Neuroticism. A term essentially equivalent to neurosis but intended to emphasize that neurosis or neurotic trends vary continuously in amount throughout the population.

Objective-Analytic (O-A) Battery. A group of tests for measuring each of the eighteen main personality dimensions found in Objective Tests (*q.v.*). A General Purpose test for objective test measurement of personality factors.

Objective Test. A type of test which is disguised in purpose or otherwise designed to minimize deliberate falsification of responses by the person tested. May employ verbal material but tends to emphasize the person's performance and behavior. The source of *T* Data (*q.v.*).

Oblique. The relationship between factors which are not at right angles to one another in factor space; that is, are correlated. Not Orthogonal (*q.v.*).

Operational Definition. As used in this book, defining a concept in terms of scores on a factor-dimension or set of factor-dimensions. Methods used for operational definition are Type Definition and Trait Definition (*q.v.*).

Orthogonal. The relationship between factors which are at right angles to one another in factor space; that is, *not* correlated. Not Oblique (*q.v.*).

P. Symbol referring to the psychometrist, proctor, or person doing the testing, as distinguished from the person being tested or observed (*S* or Subject, *q.v.*).

P-Technique. A factor analytic design which measures a single person on the same set of variables over a number of different occasions. Correlations between the variables are computed over these occasions as entries, then factor analyzed. P-Technique and Incremental Factor Analysis (*q.v.*) are the two main methods for determining dimensions of personality change-over-time (or States).

Parmia. The high-score (positive) pole of a personality dimension, characterized by venturesomeness, bold equanimity, and insusceptibility to threat. It is believed to represent a parasympathetic resistance to sympathetic action. Scores on this factor are heavily determined hereditarily. Indexed as questionnaire factor H+, or U.I.(Q) 8. Opposite pole is Threctia.

Path-Choice Coefficient. A statistic which relates personality dimensions to choices of adjustment paths, stating the probabilities that a certain type of personality will determine a particular choice of path at a given adjustment choice-point. See Chapter 13.

Path-Personality Chart. Same as Adjustment Process Analysis Chart.

Path-Personality Coefficient. A statistic summarizing the relationship between personality and a given adjustment path. A combined result of personality tending to determine choice of path (Path-Choice Coefficient) and of changes in learning and personality as a result of having chosen that path (Path-Transformation Coefficient).

Path-Transformation Coefficient. A statistic which relates experiences on life-adjustment paths to learning and other forms of personality change. It states what such path experience does to the individual, after the path or choice has been made; that is, it states, in the broadest sense, what he learns from it.

Pathemia. One pole of a personality dimension, characterized by emotional immaturity and affectivity, in the sense of reacting to problems with cognitively unfocussed feelings rather than with realism and objectivity. A living and perceiving in emotional terms, with some associated depression and discouragement. Indexed as first-order objective test factor U.I. 22— and second-order questionnaire factor F(Q)III+. Opposite pole of the factor is Corticalertia (*q.v.*).

Pattern Similarity Coefficient. A statistic (r_p), ranging from +1.00 to −1.00, which expresses the degree of similarity or dissimilarity between two Profiles of Factor Scores. (Profiles can be for single individuals or for groups of individuals.) This statistic takes into account shape, level and emphasis of the profiles, and, for profile comparison purposes, therefore, it is superior to the usual correlation coefficient, which considers only shape. Also known as Profile Similarity Coefficient.

Personality Sphere. Essentially, as used in this book, the range of measurable human personality.

Praxernia. The low-score (negative) pole of the Autia-Praxernia personality dimension. Thus, practical, conforming behavior, lack of Autia (*q.v.*). Indexed as questionnaire factor M— and objective test factor U.I. 34—.

Pre-Metric. Concept, theory, or practice which operates without assistance from exact test measurement techniques, depending on naturalistic observation and inferences based thereon.

Premsia. One pole of a personality dimension, characterized by protected emotional sensitivity, dependence, lack of aggressiveness, and tender-mindedness. Higher in women. Indexed as questionnaire factor I+ and objective test factor U.I. 16—, but, though related, these two factors are not identical empirically. Hence, the text usually makes clear whether the term refers to only one of them or to what is common to both of them. Opposite pole is Harria (*q.v.*).

Primary Factor or Primary. A First-Order Factor found when factoring a sample of variables deliberately chosen to represent the total domain concerned; for example, the total modality of ability or the Personality Sphere. Contrast also with Second-Order Factor.

Profile. As used in this book, the scores of a person or group of persons on each of a set of distinct traits or factors. The order in which traits are listed is not prescribed, but a matter of convenience.

Profile Similarity Coefficient. Same as Pattern Similarity Coefficient (*q.v.*).

Promethean Will. The high-score (positive) pole of a personality factor-dimension, characterized by irreverence, aggressiveness, resourcefulness, determination, critical practicality, perfectionistic drive, and, generally, a capable egoism. Found both as a second-order questionnaire factor, F(Q)IV+, and a first-order objective test factor, U.I. 19+.

PROTENSION. A personality factor-dimension characterized at this high-score pole by suspiciousness, jealousy, and rigid defenses. Indexed as questionnaire factor L+ or U.I. (Q) 12.

PSYCHOTICISM. A term essentially equivalent to psychosis but intended to emphasize that psychosis or psychotic trends vary continuously in amount throughout the population.

PSYCHOTIC-CONTRIBUTORY FACTOR. A factor whose scores significantly discriminate between clinically judged psychotics and normals.

P.U.I. P-TECHNIQUE UNIVERSAL INDEX, thus, P.U.I. 2, P.U.I. 9, etc., in which the numbers refer to different factors in a system indexing factor-dimensions in personality change (STATES). Parallels, for states, the UNIVERSAL INDEX (U.I.) system, which classifies characterological trait factors.

Q DATA. Data gathered by QUESTIONNAIRE measurement.

QUESTIONNAIRE. A test which depends primarily on the individual's self-aware report on himself, although questions are sometimes disguised in purpose. Scored by key. Source of *Q* DATA.

R-INCREMENTAL TECHNIQUE. Same as INCREMENTAL FACTOR ANALYSIS.

R-TECHNIQUE. A design which measures a group of persons on the same set of variables at one occasion then factor analyzes the correlations between these variables to determine personality dimensions descriptive of inter-individual differences at any one time (or TRAITS). Contrast with P-TECHNIQUE for finding STATE dimensions.

RATING. As used here, any quantification of a person's behavior based on the perceptions of an observer *not* employing key-scored tests or other measurements with standard scoring systems. Hence, there is not perfect agreement among rating observers as to the score attained. Source of *L* DATA.

RECONNAISSANCE TEST (or INTERVIEW). In testing for conflict, the initial exploratory observation which selects particular manifestations of a given individual's dynamic problem, to be included with a number of marker motivational variables, meaningful for all persons. These variables from the specific problem areas of the particular individual, taken with the common variables measured for all individuals, make up the CONFLICT ANALYSIS BATTERY, which yields a CONFLICT INDEX.

REGRESSION. Same as NEUROTIC REGRESSIVE DEBILITY.

REGRESSION COEFFICIENT. A statistical device for making the best possible prediction of score on one variable, from knowledge of score on another variable. Not to be confused with regression as a clinical concept or as a factor-dimension.

REGRESSIVE DEBILITY. Same as NEUROTIC REGRESSIVE DEBILITY.

RELIABILITY. Essentially, the consistency of a *test* in measuring whatever it claims to measure or the agreement among observers on the quantitative value to be assigned a given *rated* performance. The degree of reliability is given by a correlation coefficient, but there are several distinct varieties of reliability (see Chapter 15).

"RELIGIOUS" RESIGNATION. Lack of PROMETHEAN WILL (*q.v.*). Low-score (negative) pole of the PROMETHEAN WILL-RESIGNATION personality trait dimension, characterized by renunciation and lack of aggressiveness. Second-order factor F(Q)IV— and first-order test factor U.I. 19—. See also, SUBDUEDNESS.

RESPONSIVE WILL. Same as ADAPTATION ENERGY.

RIGID SUPEREGO. The high-score (positive) pole of a factor-dimension found in objective tests, characterized by exhaustion phenomena plus a curious combination of socially-oriented behavior with rigid, individualistic, uncooperative behavior. Ambivalences are hypothesized as resulting from powerful early introjection of behavior standards at the hands of fond but strict and dominant parents. Indexed as objective test factor U.I. 28+, and believed to involve some aspects of the clinical concept of SUPEREGO (*q.v.*). Opposite pole is ZEPPIA.

ROTATION. A technical term for the shifting of factor axes and their hyperplanes from the positions initially obtained after FACTOR EXTRACTION. In this text, rotation is always for the purpose of obtaining SIMPLE STRUCTURE (*q.v.*).

r_p. Symbol for PATTERN SIMILARITY COEFFICIENT, *q.v.*

S (SUBJECT). A symbol designating the subject, that is, the person tested or otherwise observed and studied in research or practice.

SCHIZOTHYMIA. The low-score (negative) pole of the CYCLOTHYMIA-SCHIZOTHYMIA personality dimension, characterized by aloofness, reserve, and some hostility. Indexed as questionnaire factor A— or U.I.(Q) 1—.

SECOND-ORDER FACTOR. A factor which describes the correlations among FIRST-ORDER FACTORS after they have been rotated to SIMPLE STRUCTURE. A dimension of co-variation in the correlations between factors. Second-order factors describe more massive, broader organizations of personality.

SELF-SENTIMENT. Generally, willed control of impulse, temperamental capacity to integrate, and strong investment of appropriate behavior integrated about the self concept (or, roughly, self-respect). Aspects of this concept are involved in questionnaire factor Q_3 (usually called Self-Sentiment Control), objective test factor U.I. 36 (usually called Strength of Self-Sentiment Development), and a purely dynamic factor measured by the MOTIVATIONAL ANALYSIS TEST. Since these three factors are not identical empirically, they are best thought of as representing somewhat different aspects of the self-sentiment concept, with some common core of similarity.

SIGNIFICANCE, STATISTICAL. Essentially, means that a certain score difference, correlation, or loading could not have occurred by chance alone in sampling or through an experimental or other error and, in this sense, is real.

SIMPLE STRUCTURE. A criterion for ROTATION of factors, which is attained when the number of zero or near-zero loadings (HYPERPLANE COUNT) is maximized for each factor. Preferred in this text as a criterion for rotation. See Chapter 3.

SOURCE TRAIT. A factor-dimension, stressing the proposition that variations in value along it are determined by a single, unitary influence or source. Contrast with SURFACE TRAIT.

SPECIAL PURPOSE TEST. A relatively brief test designed to measure either some single factor-dimension or some special combination of factors in a single score. Aimed to get at one particular criterion. Contrast with GENERAL PURPOSE TEST.

SPECIFICATION EQUATION. An equation which predicts performance on a specific behavior or task for an individual, from knowledge of (a) the association of that behavior with a set of factors, and (b) the individual's endowment on each of the factors.

STATE. A personality dimension describing change-over-time within a single individual or in groups of individuals. Essentially, a factor-dimension in *intra*-individual change as contrasted with a TRAIT (*q.v.*) which describes *inter*-individual differences at any one time. State dimensions are discovered by P-TECHNIQUE or by INCREMENTAL FACTOR ANALYSIS.

STAVES. Units in a scale for converting questionnaire raw scores to units which are standard relative to the population. Exactly like STENS (*q.v.*), except that staves are only a five-point scale, extending from two and one-half standard deviations below the population average (stave 1) to two and one-half standard deviations above (stave 5). Stave 3 represents the population average.

STENS. Units in a standard ten scale, in which ten score points are used to cover the population range in fixed and equal standard deviation intervals, extending from two and one-half standard deviations below the mean (sten 1) to two and one-half standard deviations above the mean (sten 10). The mean is fixed at 5.5 stens. In this book, questionnaire raw scores are usually converted to stens, when intending to use them normatively (to compare obtained values with population values).

STIMULUS-CONTROLLED P-TECHNIQUE. A P-TECHNIQUE (*q.v.*) which enters score values for the intensity of manipulated stimuli as well as for levels of response. In the present book, this technique also involved stringing together P-technique distributions on each of several people into a single distribution.

STRESS. With initial capitalization, the term refers to either or both of two factor-dimensions in *response* to challenge or physical insult: EFFORT STRESS (*q.v.*) or ADAPTATION STRESS (*q.v.*), the latter including the former plus other states. The context makes clear which of the two STATE factors is intended.

SUBDUEDNESS OR RESIGNATION. The low-score pole of the PROMETHEAN WILL-RESIGNATION personality factor-dimension, as this appears in its STATE form, F(Q)IV— and U.I. 19—.

SUBSIDIATION. A term referring to the fact that achievement of most or all goals requires prior achievement of a series of sub-goals. For example, before achieving the goal "having one's own home," one may first have to achieve such sub-goals as "getting a better-paying job," "gaining the confidence of a banker," etc., the latter two being subsidiated to the former.

SUPEREGO. Sometimes used here in its broad clinical sense; but some aspects of the concept can be given exact operational reference in terms of at least three distinct, yet probably related, factor-dimensions: RIGID SUPEREGO, U.I. 28+; TIED SOCIALIZATION, F(T)I+, and questionnaire factor G.

SURFACE TRAIT. A set of personality characteristics which are correlated but do not form a factor, hence, are believed to be determined by more than one influence or source. Contrast with SOURCE TRAIT.

SURGENCY. The high-score (positive) pole of a personality dimension found in questionnaire data, characterized by cheerfulness and alertness. Indexed as factor F+ or U.I.(Q) 6. Opposite pole is DESURGENCY (*q.v.*).

t-TEST or t-RATIO. A statistic for determining whether or not two groups of persons differ significantly (by more than chance expectation) on a given test, factor, or other score.

T DATA. Data which stem from the use of an OBJECTIVE TEST (*q.v.*) rather than a QUESTIONNAIRE (*Q* DATA) or a RATING (*L* DATA).

TEMPERAMENTAL ARDOR. A second-order personality dimension, showing at its high-score pole an inflexibility and intensity of dynamic demands, obduracy to reason, and lack of sublimatory capacity. Indexed as second-order objective test factor F(T)III+.

TEST. Any device for measuring personality which is scored by key or other standard scoring system so that all observers will agree on the score value to be assigned a given person's performance in the situation. The category includes QUESTIONNAIRES and OBJECTIVE TESTS, but not RATINGS.

TEST-CENTERED APPROACH. The attempt to extract as much evidence on personality as possible from one or a few single tests. Contrasts with TRAIT-CENTERED APPROACH (*q.v.*).

THRECTIA. The low-score pole of the PARMIA-THRECTIA personality dimension, characterized by timidity, withdrawal, and susceptibility to threat. Indexed as factor H− or U.I.(Q) 8−. Opposite pole is PARMIA (*q.v.*).

TIED SOCIALIZATION. The high-score pole of a broad personality dimension, characterized by high regard for moral laws, self-control, and renunciation of tempting, short-term goals for long-term goals. Believed to represent at least some aspects of SUPEREGO (*q.v.*) as clinically conceived. Indexed as second-order objective test factor F(T)I+.

TORPOR. A dimension of personality change-over-time, involving refusal to react to the environment and inhibition of emotional involvement. Indexed as state factor P.U.I. 1.

TRAIT. A characterological or relatively permanent feature of personality. Technically, as used in this book, a factor-dimension found by R-TECHNIQUE analysis of inter-individual difference. Contrast with STATE (*q.v.*).

TRAIT-CENTERED APPROACH or FACTOR-CENTERED APPROACH. The factor or trait is the center and focus of theoretical and practical interest, with the understanding that the particular tests used to measure the factor are a matter of some irrelevance (INDIFFERENCE OF MEDIUM or INDICATOR). Contrasts with TEST-CENTERED APPROACH.

TRAIT DEFINITION. A concept is attached to a factor insofar as that factor involves behavior which (experts agree) manifests the entity contained in that concept. Thus, a factor is trait-defined in the area of neurosis insofar as it involves (is loaded by) responses which clinicians agree have face valid content as neurotic signs or symptoms. Along with TYPE DEFINITION (*q.v.*), one of the two main methods of defining a concept in terms of an empirically found factor.

TRANSFORMATION THEORY. The consideration of all possible changes through experience in the organism. This includes as subcategories (a) learning, and (b) resource change (changes in the physiological or psychological resources of the individual). Transformation theory includes deteriorative as well as progress changes.

TYPE DEFINITION. A factor is type-defined as belonging in a given clinical area insofar as scores on it discriminate between normals and a clinical criterion group in that area. Thus, factors are type-defined as involved in neurosis (that is, NEUROTIC-CONTRIBUTORY) if scores on them are significantly different for clinically judged neurotics as contrasted with normals. The most important method used in relating a factor to a clinical concept. The other method is TRAIT DEFINITION.

UNIQUE TRAIT. A set of characteristics patterned idiosyncratically in an individual, so that other individuals cannot meaningfully be given scores on this trait. Differences between individuals on unique traits tend to be qualitative and cannot be expressed quantitatively or, rather, completely in a quantitative manner. Contrasts with COMMON TRAIT (*q.v.*).

UNIVARIATE APPROACH, or EXPERIMENT, or RESEARCH. Dealing with only one or a few variables at a time, either as responses, or manipulated conditions, or both. Contrasts with MULTIVARIATE (*q.v.*).

UNIVERSAL INDEX (U.I.) NUMBER. A number indexing of confirmed TRAIT or characterological factors, without implying interpretation (INTERPRETIVE HYPOTHESIS). Thus, U.I. 20, U.I. 33, etc., refer to distinct trait factors. The symbols *Q, L,* and *T* (*q.v.*) are sometimes interposed between the U.I. and the number to indicate whether the factor was found in questionnaire, rating, or objective test data, thus, U.I.(Q)8. Those U.I. numbers appearing in text without source indicators (*Q* or *L*) express factors derived from objective test data. Paralleled by the P.U.I. system (*q.v.*) for indexing dimensions of personality change (STATE factors).

VALIDITY. A test's ability to predict performances other than performance on itself, that is, a test's correlation with a factor, life-situation performance, clinical category placement, etc. There are several varieties of validity. See CONSTRUCT VALIDITY, CLINICAL CRITERION VALIDITY, and Chapter 15.

VARIABLE. As used here, essentially a set of numerical scores which take different values for different persons, occasions of measurement, or other entities being measured. Thus, a set of scores when all scores are not the same value. Varying intensities of stimuli applied, as well as varying levels in response, can be quantified to yield a variable.

VARIANCE. Generally, the degree to which scores on a given test VARIABLE differ from person to person or occasion to occasion in a given sample; hence, essentially, the amount of discriminatory information in a variable (set of scores). Specifically, variance is the square of the standard deviation.

ZEPPIA. Low-score (negative) pole on the factor-dimension of RIGID SUPEREGO (*q.v.*). Means lack of RIGID SUPEREGO.

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